

Vernier
2002 CATALOG



**Data Collection
for Computers
and Calculators**

Why Vernier?

2001 was a busy, but very good year for Vernier Software & Technology. We celebrated our 20th Anniversary with our customers at AAPT in Rochester, NY, at ChemEd in Toronto, and with our employees here in Oregon. We expanded our offices into unused space in our building, adding a classroom for workshops. We were again selected as one of the "100 Best Companies to Work For in Oregon." Our LabPro interface has been very well received. It won a 2001 "Award of Excellence" from Technology & Learning. And we have been busy developing new sensors and new software, including Graphical Analysis 3.0.

To teachers who have been our customers for all or part of the 20 years, we would again like to say, "Thank you for your loyalty!" If you are interested in using our products for the first time, here are some reasons customers say they choose to use Vernier products:

- **Experience.** We have 20+ years of experience in developing products that work in the classroom and lab.
- **Ease of use.** The Vernier LabPro® interface and auto-ID sensors allow you to collect data more easily than ever before.
- **Affordability.** We appreciate that funds are limited, and we try to keep our prices low so that schools can afford them.
- **Curriculum.** We have developed a series of great lab books to make it easy to start using electronic data collection.
- **Tech support.** We have the best technical support available. Many of our tech support people are former teachers, and we know how important it is to get problems solved quickly.
- **Training.** We have an extensive training program, including free hands-on workshops held around the country. We also have a new (free) "Getting Started with Vernier" CD, with video clips on how to use our products.
- **Free site license.** Purchase of a single copy of our software entitles you to a site license that includes all computers in your school and your students' own computers.
- **Repairs.** In our 20 years, we have rarely charged a customer for a repair.

We encourage you to request our new training CD and to give our products a try on a 30-day (or longer) preview basis. Feel free to contact either of us personally at any time. Over the years, we have learned a lot from our customers, and we continue to listen. We look forward to hearing from you!

Dave and Christine Vernier
dvernier@vernier.com and cvernier@vernier.com



Dave and Christine Vernier at the Vernier 20th Anniversary Party in Rochester, NY.

NEW!

Graphical Analysis 3.0

Our popular graphing program just got better! Some of the new features:

- The purchase price includes a free site license for a school, college department and student home computers (Macintosh and Windows)!
- 100% interchangeability between Macintosh and Windows files.
- Full support of all serial and USB calculator TI-GRAPH LINK™ cables.
- Allows students to create multiple-page lab reports.
- Improved analysis tools.

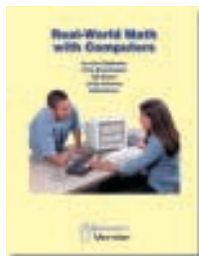
See pp. 8-9.



NEW!

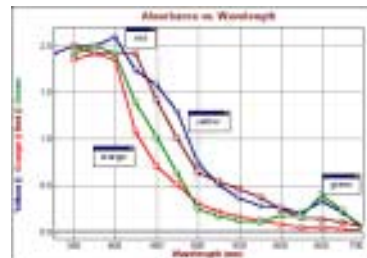
Real-World Math with CBL 2™ and LabPro® Real-World Math with Computers

These popular books have now been rewritten for LabPro (with computers or calculators) and CBL 2. Twenty-nine experiments using Vernier sensors are included. See page 31.



NEW!

Spectro Pro



Our newest data acquisition program allows you to collect and analyze data from Spectronic 20, 20D, 20D+, Genesys 20, or Flinn spectrophotometers. See page 10.



NEW!

Sound Level Meter

Students can now monitor sound levels in decibels using this new Vernier sensor. See page 51.

NEW!

Current Probe

We now have a single-channel current sensor for use in measuring current flow in physics and chemistry experiments. It can be used with the Differential Voltage Probe in a variety of low-voltage DC and AC experiments. See page 44.



NEW!

Differential Voltage Probe

Use this new sensor to make measurements in most "battery and bulb" circuits. It can be used with the Current Probe in a variety of low-voltage DC and AC experiments. See page 44.

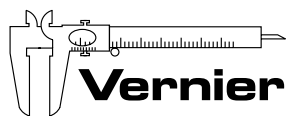


FREE!

Vernier Training CD



New users, veteran users, or anyone who wants to learn more about our products will want a copy of our "Getting Started with Vernier" training CD. Watch as we show you how to get started, or how to perform 42 experiments from our lab manuals. Call us or e-mail video@vernier.com to receive a free copy.



Vernier
Vernier Software & Technology
 13979 SW Millikan Way
 Beaverton, OR 97005-2886
 phone: 503-277-2299 • fax: 503-277-2440
info@vernier.com • www.vernier.com

Table of Contents

New Products	Front Cover-1
Training and Workshops	2-3
■ Vernier Training CD	2
■ Hands-On Workshops	2
■ Summer Workshops, Workshops at Your School, and Independent Workshops	3
Getting Started with Vernier	4-5
LabPro and Logger Pro®	6-7
Graphical Analysis	8-9
Spectro Pro and Do-It-Yourself Programming	10
Packages for Computers and Calculators	12-29
■ Chemistry	12-13
■ Biology	14-15
■ Physics	16-17
■ Middle School Science	18-19
■ Water Quality Testing	20-21
■ Physical Science	22-23
■ Earth Science	24-25
■ Math	26-27
■ Comprehensive Science	28-29
Lab Manuals and Physics Curriculum	30-32
■ Vernier Lab Books	30-31
■ Other Physics Curriculum for Logger Pro	32
Calculator Data Collection	33-40
■ CBL 2™	33-34
■ Graphing Calculators	34-35
■ ViewScreens™	34-35
■ Sensors for CBL 2	36
■ Packages for CBL 2	37-40
Older Interfaces and Software	41
Sensors	42-52
■ Sensor Compatibility/Price Chart	42
■ Sensors and Descriptions	43-52
Accessories and Adapters	53-54
Index	55
General Information	56



Want Training?

NEW!

Vernier Training CD



Need help getting started with our products? Would you like free training? Would you like to see LabPro in action before making the commitment to buy? If you answered “yes” to any of these questions, our FREE training CD, “Getting Started with Vernier,” is what you need.

New users, veteran users, or anyone who wants to learn more about our products will find useful information in this video training guide. If you would like a free copy of this CD, simply send an e-mail that includes your complete mailing address to video@vernier.com.



Hands-On Evaluation Workshops

Join us for an evening to learn how to integrate our data-collection software, interfaces, and sensors into your classroom. These free, 4-hour, hands-on workshops include dinner and lab handouts. Contact us or visit our web site for up-to-date information and registration.

FEBRUARY

Phoenix, AZ
Tucson, AZ
Little Rock, AR
Shreveport, LA

MARCH

Baton Rouge, LA
New Orleans, LA
Mobile, AL
Montgomery, AL
Columbus, GA
Atlanta, GA
Augusta, GA
Spartanburg, SC
Greensboro, NC

APRIL

Norfolk, VA
Richmond, VA
Alexandria, VA
Baltimore, MD
Wilmington, DE
Philadelphia, PA
New Haven, CT
Springfield, MA
Providence, RI
Boston, MA
Portsmouth, NH
Portland, ME

MAY

Burlington, VT

SEPTEMBER

Dallas, TX
Austin, TX
San Antonio, TX
Corpus Christi, TX
Houston, TX
Duluth, MN

OCTOBER

Minneapolis, MN
Green Bay, WI
Milwaukee, WI
Chicago, IL
Lansing, MI
Detroit, MI
Chattanooga, TN
Nashville, TN

NOVEMBER

Indianapolis, IN
Springfield, IL
Des Moines, IA
Lincoln, NE
Springfield, MO
Tulsa, OK
Wichita, KS
Oklahoma City, OK
Amarillo, TX



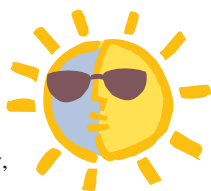
Free Hands-on Training at Conferences

Vernier will offer hands-on workshops at each of these conferences. No pre-registration is required. For a full listing of our conference exhibits, check the Workshops section of our web site at www.vernier.com.

- NSTA National Convention, San Diego, CA, March 27-30
- AP National Conference, Chicago, IL, July 19-22
- Biennial Conference on Chemical Education, Bellingham, WA, July 28-August 1
- AAPT Summer Meeting, Boise, ID, August 3-7
- American Chemical Society, Boston, MA, High School Day, August 19
- 2YC3, Farmington, CT, Early Fall
- Northwest Mathematics Conference, Portland, OR, October 10-12
- NSTA Eastern Area Convention, Louisville, KY, October 24-26
- National Association of Biology Teachers, Cincinnati, OH, October 30-November 2
- 2YC3, Kansas City, KS, November 8-9
- NSTA Northwestern Area Convention, Portland, OR, November 14-16
- NSTA Southwestern Area Convention, Albuquerque, NM, December 5-7



Summer Workshops



Join us for a day to learn how to integrate our computer and calculator data-collection hardware and software into your chemistry, biology, physics, math, middle school science, physical science, and earth science curriculum. These 6-hour, hands-on workshops include lunch and lab handouts.

The cost of the workshop is \$50 for the training only, or \$250 for the training package, which includes the workshop, a LabPro, Logger Pro software, and a Temperature Probe. The registration form can be found on our web site.

You will also have the opportunity to earn one credit hour through the Portland State University Center for Science Education (approximate cost \$70, payable to PSU). The credit hour will be awarded to participants who attend the workshop and elect to complete a follow-up project using electronic data collection methods. A brief lesson plan and a description of how you plan to integrate this project into your curriculum will be required.

- June 11 - Denver, CO
- June 13 - Ft. Collins, CO
- June 18 - Portland, OR
- June 20 - Portland, OR
- June 25 - Manchester, NH
- June 27 - Boston, MA
- July 9 - Tampa, FL
- July 11 - Ft. Lauderdale, FL
- August 1 - Boise, ID
- August 5 - Missoula, MT
- August 13 - San Diego, CA
- August 15 - Los Angeles, CA
- August 20 - Portland, OR
- August 22 - Portland, OR



Vernier Workshops in Portland

We can conduct a workshop at our office specially designed for you. The workshop can be training only (no charge) or it can include equipment as part of the cost. Contact us for details.

Vernier Workshops at Your School

We can come to your school to do a one-day, hands-on workshop using your Vernier equipment. This workshop can be computer- or calculator-based data collection, in any science subject. The fee is \$1000, which includes travel expenses. More information and an On-Site Workshop Application can be found on our web site.

Additional Workshops

The following independent workshops provide great instruction in the use of Vernier products. Some emphasize the use of our LabPro interface with Windows or Macintosh computers, while others use the Texas Instruments CBL 2 System or Vernier LabPro with TI Graphing Calculators as the primary data collection tool.

Texas Instruments CBL 2 Training: Teachers Teaching with Technology™ and TI

This professional development program organizes and sponsors many workshops and conferences throughout the year for training teachers to use the Texas Instruments CBL 2, CBR, and graphing calculators.

- **T³ Summer Institutes** are week-long courses held throughout the summer. Phone: (888) 282-8233, web site: www.t3ww.org/t3
- **T³ 2002 International Conference.** March 15-17, Calgary, Alberta, Canada, web site: www.t3ww.org/t3
- **TI Workshop Loan Program** will send CBL 2s, Graphing Calculators, and Vernier sensors to your school for training. For details, visit www.ti.com/calc/loan or call (888) 917-6411.

Water Quality for Science Teachers

May 28-June 1 and June 3-7, 2002. Bismark State College, Bismark, ND. Contact: fkoch@gwmail.nodak.edu.

Institute for the Advancement of Science Teaching

These workshops for AP & Pre-AP biology, chemistry, physics, environmental science, and middle school science will be conducted the week of June 17-21, 2002 at James Madison HS, San Antonio, TX. Contact advsci@gvtc.com or visit www.gvtc.com/~advsci/.

Physics Workshops

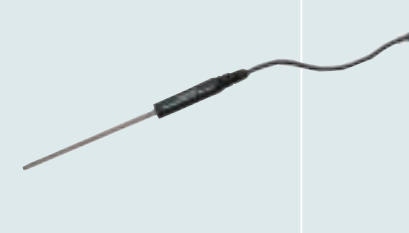


- **2-Year College Physics Workshops.** Contact: <http://tycphysics.org>
- **RealTime Physics II: Activity-Based Learning of Electric Circuits and Optics in Lab.** Summer AAPT Meeting, August 4, 2002, Boise, ID. Contact: sokoloff@oregon.uoregon.edu
- **Interactive Lecture Demonstrations II: Active Learning of Electric Circuits and Optics in Lecture.** AAPT Meeting, August 4, 2002, Boise, ID. Contact: sokoloff@oregon.uoregon.edu
- **Chautauqua Short Course: Promoting Active Learning in Introductory—Physics Courses I.** June 6-8, 2002 University of Oregon, Eugene, OR. Contact: sokoloff@oregon.uoregon.edu
- **Chautauqua Short Course: Promoting Active Learning in Introductory—Physics Courses II.** May 9-11, 2002. Dickinson College, Carlisle, PA Contact: sokoloff@oregon.uoregon.edu
- **The Activity-Based Physics Institutes.** Session I (Starter): June 16-28, 2002. Session II (Follow-up): June 15-27, 2003. University of Oregon, Eugene, OR and Dickinson College, Carlisle, PA <http://physics.dickinson.edu/ABPinstitutes> or oliver@dickinson.edu. Application deadline is February 15, 2002.
- **Explorations in Physics: A Project-Centered Curriculum for Non-Scientists.** Dickinson College, Carlisle, PA, July 7-12, 2002. <http://physics.dickinson.edu/EIPWkshp> or oliver@dickinson.edu. Application deadline is March 15, 2002.



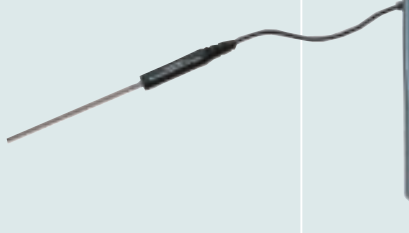


GETTING STARTED WITH VERNIER

What do I need to collect data?

COMPUTER

SENSOR	INTERFACE	COMPUTER
		
Connect sensor(s) to LabPro	Connect LabPro to your computer (via USB or serial)	Start the Logger Pro program

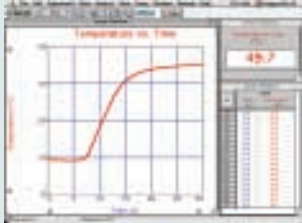


CALCULATOR

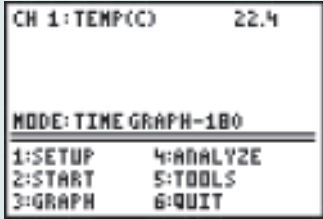
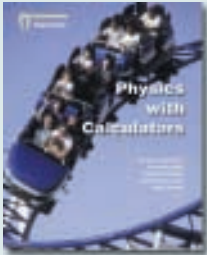

SENSOR	INTERFACE	CALCULATOR
		
Connect sensor(s) to LabPro	Connect LabPro to a TI Graphing Calculator	Start the DataMate program on the calculator

STAND-ALONE

WITH JUST LABPRO	
	<ul style="list-style-type: none"> ■ Connect one or more of our auto-ID sensors. ■ Press the Quick Setup button to prepare LabPro for data collection. ■ Press Start to begin collecting data. ■ Download data to a computer or calculator when you are finished.



SOFTWARE	EXPERIMENTS	CLASSROOM SETUP
<p>Buy just one copy per school!</p>  <p>Click the Collect button in <i>Logger Pro</i> and start collecting data!</p>	 <p>Use our lab books for hundreds of ready-to-use, standards-aligned experiments</p>	 <p>A typical computer data-collection station</p>

SOFTWARE	EXPERIMENTS	CLASSROOM SETUP
 <p>Select "Start" and begin collecting data!</p>	 <p>Use our lab books for hundreds of ready-to-use, standards-aligned experiments</p>	 <p>A typical calculator data-collection station</p>

Quick-Start Package

The fastest way to get started is with our Quick-Start Package. This package includes everything you need to get up and running right away!

For **\$279** (order code QSP), you get all of this!

- LabPro Interface
- Stainless Steel Temperature Probe
- Light Sensor
- Voltage Probe
- Computer cables (USB & serial)
- Calculator cradle
- DataMate calculator program
- Calculator link cable
- User's manual
- AC power supply



If you are using computers, you will also need one copy of

- **Logger Pro** software. This CD includes **both** Macintosh and Windows versions, **and** includes a free site license for use on the teacher's and students' own computers! (Order Code LP, \$65)



Vernier LabPro®



The Vernier LabPro interface is the heart of our data collection system, offering unparalleled flexibility, power, portability, and ease of use at an affordable price.

To collect data, simply connect LabPro to your computer or TI Graphing Calculator, plug in one of our sensors, and start the data collection program. The computer or calculator detects which sensors are connected. Just one click and you're collecting data! You can even take LabPro to an amusement park and collect data without a computer or calculator attached. Data collection has never been easier!

Even though LabPro is our newest interface, you don't need a top-of-the-line computer to collect data. LabPro can connect to most computers made since about 1994 (see page 7 for system requirements). LabPro is this flexible because it has both serial and USB ports, something no other system offers.

When using LabPro with a calculator, you can choose from any of the TI Graphing Calculators that are currently available. With your calculator attached to LabPro using our convenient cradle (included), you can easily collect data anywhere in your school or at your local stream. The calculator programs are stored within LabPro, making it easier than ever to use your students' calculators.

LabPro Specifications	
Channels for sensors	4 analog and 2 digital
Compatible Vernier analog sensors	More than 40 sensors listed on page 42
Compatible Vernier digital sensors	Motion, photogate (2), radiation, rotary motion, Digital Control Unit
Analog output	Yes
Digital output	Yes
Maximum sample rate	50,000 samples/second
Internal data storage	12,000 points
Resolution	12-bit
Computer connections	Serial or USB for Macintosh and Windows
Compatible calculators	TI-73/82/83/83 Plus/86/89/92/92 Plus
Built-in calculator program	Yes (DataMate)
Stand-alone use	Yes
Sensor included free	Voltage Probe
Additional included items	Computer cables (both serial & USB), AC power supply, calculator link cable, calculator cradle, and user's manual
Cost	\$220

LabPro System includes:

- LabPro Interface
- Voltage Probe
- Computer cables (USB & serial)
- Calculator cradle
- DataMate calculator program
- Calculator link cable
- User's manual
- AC power supply

Order Code LABPRO \$220



Features

Compatibility

- Windows or Power Macintosh computers, serial or USB port, with Logger *Pro* software.
- TI Graphing Calculators (TI-73, TI-82, TI-83, TI-83 Plus, TI-86, TI-89, TI-92, TI-92 Plus)



Six Data-Collection Channels

- Four analog channels for over 40 different sensors, such as temperature, dissolved oxygen, gas pressure, pH, force, etc.
- Two digital channels for motion detectors, photogates, radiation monitors, and rotary motion sensors.

Sensor Compatibility

- Supports our auto-ID sensors or can be used with our older sensors using the appropriate adapter.

Upgradeable

- As new features become available, you can easily add them to your LabPro—simply download and install the new operating system from our web site...free!

Sampling

- Samples up to 50,000 readings per second
- 12-bit A/D conversion
- Internally stores 12,000 data points

Built-In Calculator Program

- Press one button to transfer our data-collection program, DataMate, to a TI Graphing Calculator. Run DataMate to collect, graph, and analyze data in the classroom or in the field.

Stand-Alone Operation

- LabPro can collect data in the field without a computer or calculator.

— LabPro is a winner of: —



AAPT
Most Innovative New
Product Award

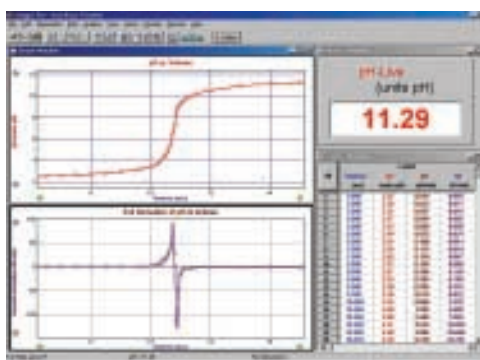


Sensors for LabPro

Sensor	Order Code	Price
3-Axis Accelerometer	3D-BTA	\$199
25-g Accelerometer	ACC-BTA	\$91
Low-g Accelerometer	LGA-BTA	\$90
Barometer	BAR-BTA	\$58
CO ₂ Gas Sensor	CO2-BTA	\$261
Colorimeter	COL-BTA	\$99
Conductivity Probe	CON-BTA	\$89
Current Probe NEW!	DCP-BTA	\$37
Differential Voltage Probe NEW!	DVP-BTA	\$35
Digital Control Unit	DCU-BTD	\$61
Dissolved Oxygen Probe	DO-BTA	\$191
Dual-Range Force Sensor	DFS-BTA	\$99
EKG Sensor	EKG-BTA	\$142
Exercise Heart Rate Monitor	EHR-BTA	\$91
Extra-Long Temperature Probe	TPL-BTA	\$70
Flow Rate Sensor	FLO-BTA	\$129
Gas Pressure Sensor	GPS-BTA	\$71
Instrumentation Amplifier	INA-BTA	\$51
Ammonium Ion-Selective Electrode	NH4-BTA	\$165
Calcium Ion-Selective Electrode	CA-BTA	\$165
Chloride Ion-Selective Electrode	CL-BTA	\$165
Nitrate Ion-Selective Electrode	NO3-BTA	\$165
Light Sensor	LS-BTA	\$45
Magnetic Field Sensor	MG-BTA	\$54
Microphone	MCA-BTA	\$35
Motion Detector	MD-BTD	\$64
O ₂ Gas Sensor	O2-BTA	\$186
pH Sensor	PH-BTA	\$74
Radiation Monitor	RM-BTD	\$205
Relative Humidity Sensor	RH-BTA	\$67
Respiration Monitor Belt <i>(requires GPS-BTA)</i>	RMB	\$58
Rotary Motion Sensor	RMS-BTD	\$195
Sound Level Meter NEW!	SLM-BTA	\$209
Stainless Steel Temperature Probe	TMP-BTA	\$29
Student Radiation Monitor	SRM-BTD	\$145
Turbidity Sensor	TRB-BTA	\$99
Thermocouple	TCA-BTA	\$37
Vernier Photogate	VPG-BTD	\$43
Voltage Probe <i>(included with LabPro)</i>	VP-BTA	\$9

Software **Logger Pro**[®]

This award-winning software has all of the features you need in a data-collection program, with an easy-to-use graphical interface, and at a very affordable price. *Logger Pro* may be used with more than 40 Vernier sensors. Simply connect one of our auto-ID sensors and click on the Collect button. The data are graphed in real time as you perform your experiment. The data can also be displayed in data tables, meters, or histograms. Analysis tools, including statistics, curve fits, integration, and tangent lines, are easily accessible on a toolbar. You can open an experiment file or customize settings yourself, if you prefer. Experiment files are included for more than 225 experiments in our chemistry, biology, physics, physical science, middle school science, math, and water quality lab books. *Logger Pro* can be used with our LabPro, and our older Serial Box Interface or ULI.



pH titration

Logger Pro provides all of these features:

- extensive analysis tools, including calculated columns, statistics, curve fitting, integration, interpolation, and a delta measurement tool
- multiple data runs
- data displayed in several windows using graphs, data tables, meters, histogram, strip charts, and FFTs
- auto-ID sensor recognition
- easy sensor and experiment setup with ready-to-go experiment files
- annotation of graphs and notes in a text window
- support for up to four analog and/or two digital sensors simultaneously
- support for remote data collection and retrieval

Logger Pro was developed in collaboration with the Center for Science & Math Teaching at Tufts University.

System Requirements for Windows 95, 98, 2000, NT, ME, and XP

Pentium processor or equivalent, 16 MB of RAM, available serial or USB port, and 10 MB of hard disk space.

System Requirements for Macintosh

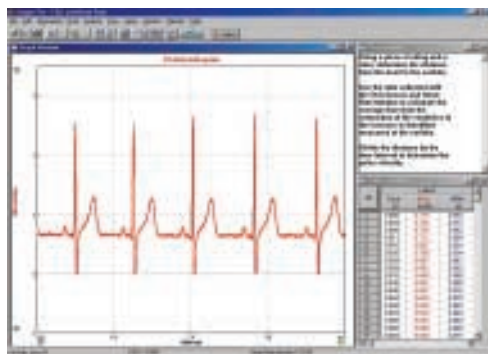
Power Macintosh, G3 or G4 processor, System 7.6.1 or newer, 16 MB of RAM, available serial or USB port, and 10 MB of disk space. Using the USB connection on Macintosh requires OS 8.6 or newer. (If you have older computers, we have a solution. Call us!)

Logger Pro for Windows and Macintosh

(Includes site license for both Windows and Macintosh versions. This site license also includes use on the teacher's and students' home computers. Free demo version available in the Downloads section of our web site.)

Order Code LP \$65

Monitoring EKG.





GRAPHICAL ANALYSIS 3.0

New 3.0 Version—Available March 1!

Graphical Analysis 3.0

Graphical Analysis 3.0 is an inexpensive, easy-to-learn program for producing, analyzing, and printing graphs. It has been one of our most popular products for years and now it's even better! We have rewritten Graphical Analysis, adding new features and updating its look and capabilities.

Use Graphical Analysis 3.0 to:

- Create and print graphs, data tables, text, FFTs, and histograms.
- Perform manual and automatic curve fits.
- Calculate statistics, tangents, integrals, and interpolations.

There are several ways to input data into Graphical Analysis 3.0:

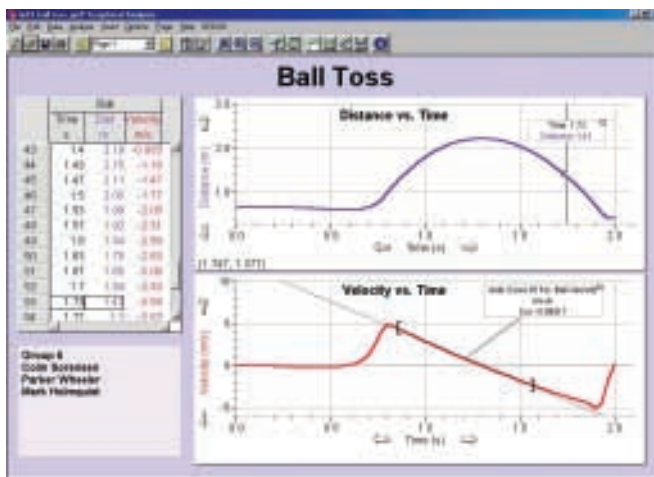
- Type the values into the data table.
- Import data collected on a TI Graphing Calculator (requires TI-GRAPH LINK—see page 35).
- Copy and paste data from another program (such as Word or Excel).
- Import data from a text file.

The Graphical Analysis 3.0 CD includes programs for both Windows and Macintosh computers and a Quick Reference Card. The user's manual is included on the CD.

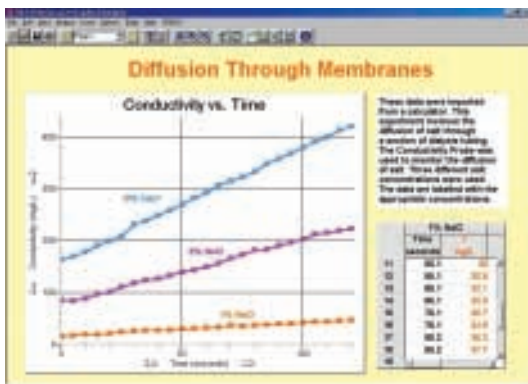


Voted most popular science software!

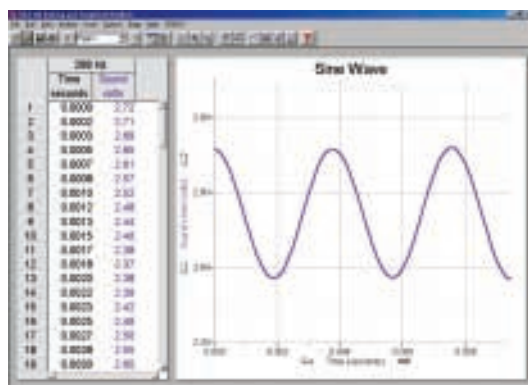
for grades 9-12 by eSchool News magazine



Ball toss data imported from a TI Graphing Calculator into Graphical Analysis.



Several data sets can be overlaid and compared on a single graph, such as in this diffusion experiment from our biology lab books.



If you like the look of the original Graphical Analysis, you can still have it. Graphical Analysis 3.0 allows for great flexibility and creativity.

Free site license with purchase!

Use the TI-GRAPH LINK cable to send calculator data to the computer and view it using Graphical Analysis software.

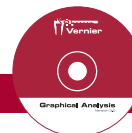


Graphical Analysis 3.0 (Windows and Macintosh)

Order Code GA\$80

Upgrade from earlier version of GA to GA 3.0

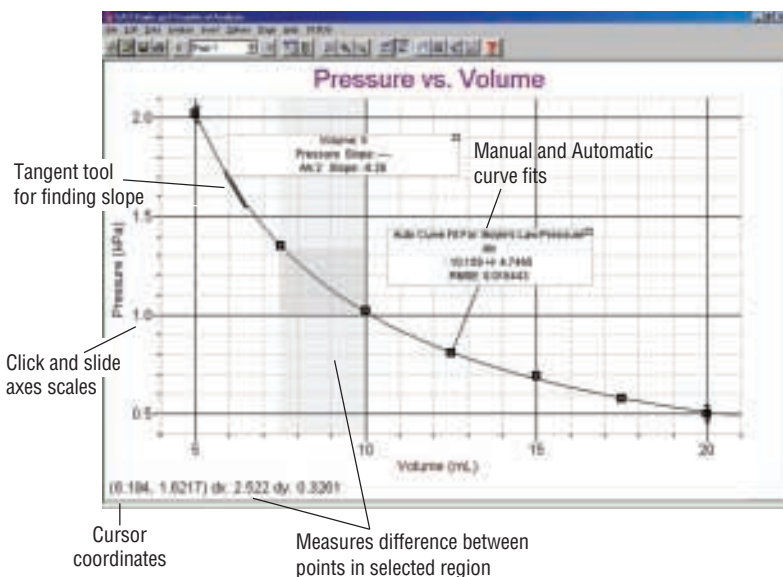
Order Code UGA\$40



Why should you upgrade to GA 3.0?

The new Graphical Analysis 3.0 provides

- free student site license
- support for black TI-GRAPH LINK for Windows cable
- support for Macintosh and Windows USB data import
- many other new features



New Features

- Create multiple pages within a document
- Supports USB calculator import for Macintosh and Windows
- Supports black TI-GRAPH LINK for Windows cable
- Improved features for report-writing
- More color
- Improved support for the newest computer operating systems
- Improved analysis tools
- Improved curve fitting
- 100% interchangeability between Macintosh and Windows files
- Improved import of other file formats
- More flexibility on how data are graphed
- Windows and Macintosh versions have the same look, feel, and functionality
- Free student site license with purchase

System requirements for Windows:

Pentium processor or equivalent, 133 MHz, 16 MB of RAM, 10 MB of hard disk space. Supports Windows 95/98/NT 4.x/2000/ME/XP.

System requirements for Macintosh:

PowerPC, System 8.1 or newer with 8 MB RAM and 10 MB hard disk space.

Do you have older computers? We have the solution! Just give us a call.

Student site license included with purchase!

What software do I need?

Not sure whether you need Logger Pro, Graphical Analysis, or both? Use this chart to compare.

Features	Logger Pro	Graphical Analysis
General description	Logger Pro is a computer data collection program. It allows you to collect data using a computer. The data can be graphed, analyzed, saved, and printed.	Graphical Analysis is an all-purpose graphing program. It also allows you to import data from a TI Graphing Calculator. The data can be graphed, analyzed, saved and printed.
Collects real-time data	Yes	No
Imports from calculator	No	Yes*

Still not sure which you need? See if you fit one of these user profiles.

User Profile	Logger Pro	Graphical Analysis
We only collect data with computers.	X	
We only collect data with calculators.		X
We collect data with both computers and calculators	X	X
We want an all-purpose graphing and analysis program, but we do not collect data with a computer or calculator.		X

* TI-GRAPH LINK is required. See page 35.



SPECTRO PRO/DCU/DO-IT-YOURSELF PROGRAMMING

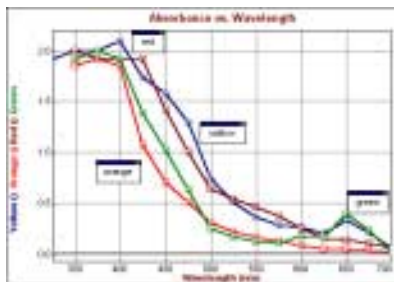
NEW! Spectro Pro

This new Vernier program allows your computer to read data from a spectrophotometer. The SPECTRONIC 20D or D+, GENESYS or Flinn Spectrophotometer can connect directly to a PC or Macintosh serial port using the appropriate cable. Analog spectrophotometers, such as a SPECTRONIC 20, can be connected to the computer through a computer interface—a Vernier LabPro, a ULI, or a Serial Box Interface.

- With the spectrophotometer connected to your computer you can
- collect Absorbance vs. Time data to do kinetics studies.
- collect Absorbance vs. Concentration data to determine the concentration of an unknown by interpolation.
- collect Absorbance vs. Wavelength data to produce an absorption spectrum.
- easily calibrate by following on-screen prompts.
- create calculated spreadsheet columns, perform curve fits on data, and do statistical analysis of data.

Spectro Pro was developed in collaboration with the Center for Science & Math Teaching at Tufts University.

System requirements for Windows and Macintosh computers are the same as those for Logger Pro (see page 7).



Fall leaf spectroscopy

Spectro Pro for Windows and Macintosh

Order Code SP \$50
(Includes site license for both Windows and Macintosh versions.)

Spectrophotometer Cables*

Flinn Spectrophotometer .. SPC-FLI (PC) or SPC-FLM (MAC)	\$25
Spec 20D or D+	SPC-IBM (PC) or SPC-MAC (MAC) \$25
Spec 20 Genesys	GEN-PC (PC) or GEN-MAC (MAC) \$25
Spec 20 or 20+	SPC-DIN (for ULI, SBI) or SPC-BTA (for LabPro) ... \$25

*If a serial port is not available, a Keyspan USB-to-Serial Adapter may be used.

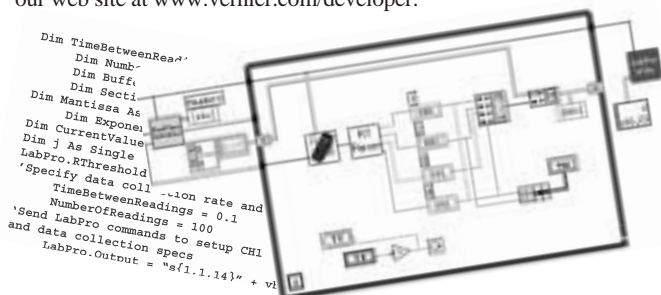
FREE! Do-It-Yourself Programming with LabPro

Over the years, we have always supported and encouraged people who enjoy programming to use our lab interfaces for custom programming. For LabPro, we now have free sample programs in Visual Basic® (for Windows), REALbasic® (for Macintosh), and even sample VIs in LabVIEW (for Macintosh, Windows, or Linux). These programs will help you get started with writing your own programs.

For each programming language, the samples include the following:

- slow analog data collection (real time)
- fast analog data collection (non-real time)
- Motion Detector data collection
- Photogate timing
- monitoring digital inputs
- controlling digital output lines
- controlling the analog output line

To get started, check out these sample programs and our LabPro Technical Reference Manual. The best thing is that this is all free on our web site at www.vernier.com/developer.



Digital Control Unit



The Digital Control Unit (DCU) gives you an easy way to use LabPro, CBL 2, or the original CBL digital ports for exciting robotics projects. It allows you to provide useful current (up to 600 mA) for controlling electrical devices. Using the DCU and simple programs, you can control motors, lamps, LEDs, buzzers, stepper motors, and other DC devices. You can even develop more elaborate projects, such as robots or automated scientific apparatus. The most exciting DCU projects involve combining sensors with control.

The Digital Control Unit is a small box with a short cable that plugs into a digital connector on the LabPro or CBL. An external power supply, such as the LabPro power supply (order code IPS, \$10), is required. Inside the DCU are visible LEDs that indicate the status of the six output lines. A socket is provided for connecting electronic devices that you build.

The DCU User's Manual includes project ideas, wiring diagrams, and explanations of how to write DCU programs. Graphing calculator, Visual Basic, and REALbasic sample programs are provided. These programs let you try out your DCU right away and can also serve as a starting point for programs that you write.

DCU project ideas include temperature-controlled environments, robots with sensors and feedback, and alarm systems.

Order Code DCU-BTD (for LabPro, CBL 2) \$61
Order Code DCU-CBL (for original CBL) \$59



Meeting Science Content Standards

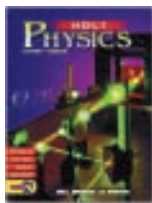
Implementation of the National Science Education Standards requires science educators to examine what they are teaching and how they are teaching it. Let Vernier help you meet state and national science standards with our standards-correlated curriculum. Check our web site (www.vernier.com/standards) for complete national and state-by-state science curriculum correlation information.

Meeting the Challenge of Curriculum Development

The integration of technology into a curriculum takes time, and time is a luxury that we know teachers do not have. To assist you in curriculum development, we have written a series of popular lab manuals (see pp. 30-31). Our data-collection products and experimental protocols have attracted the attention of many excellent educators, who often include us in their own publications. Vernier is proud to be featured in the following popular texts and lab manuals:

Holt, Rinehart, and Winston

- Holt Physics
- Holt Physics Technology-Based Lab Activities
- Holt Science Spectrum: A Balanced Approach
- Holt Science Spectrum: A Physical Approach
- Holt Chemistry: Visualizing Matter

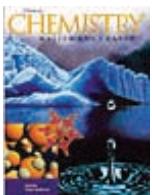


Prentice Hall

- Science Explorer Probeware Lab Manual for Computers and Calculators
- Conceptual Physics Probeware Lab Manual for Computers and Calculators
- Addison-Wesley Chemistry Probeware Lab Manual

Glencoe McGraw-Hill

- Physics: Principles and Problems Laboratory Manual
- Chemistry: Matter and Change CBL Laboratory Manual
- Glencoe Science Probeware Labs



John Wiley & Sons

- RealTime Physics
- Workshop Physics Activity Guide

Texas Instruments

- Real-World Math with the CBL 2 and LabPro
- College Physics with CBL and TI-86
- Activities for Middle Grades Science with the CBL 2 and TI-73



Key Curriculum Press

- Sensor Sensibility
- Connecting Mathematics with Science: Experiments for Pre-Calculus



Funding Your Technology Curriculum

Funding educational programs can be challenging. When budgets are cut, educational programs are often the first casualties. Still, bringing technology to your classroom is not an impossible task. Many educators have successfully applied for grants to fund their technology programs.

For tips on how to write grants and how to identify funding sources, visit our website (www.vernier.com/grants).



CHEMISTRY PACKAGES

Feel free to build your own package!

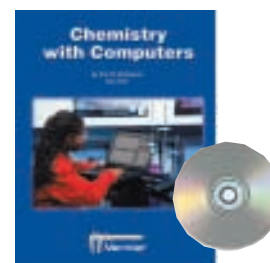
LabPro Chemistry Packages

Purchase one package per computer or calculator.

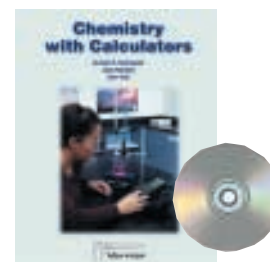
Interface and Sensors	Order Code	Starter Package CH-STR	Deluxe Package CH-DX
① LabPro Interface	LABPRO	\$220	\$220
② (2) Stainless Steel Temperature Probes	TMP-BTA	2@\$29=\$58	2@\$29=\$58
③ pH Sensor	PH-BTA	\$74	\$74
④ Gas Pressure Sensor	GPS-BTA	\$71	\$71
⑤ Voltage Probe	<i>(Included with LabPro)</i>	\$0	\$0
⑥ Conductivity Probe	CON-BTA		\$89
⑦ Colorimeter	COL-BTA		\$99
	Package Price	\$423	\$599

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Chemistry with Computers or Chemistry with Calculators lab books 326 pages with 31 ready-to-use student experiments!	CWC-LP CWCALC	\$45 each

Deluxe Chemistry Package for LabPro



The Deluxe Package contains all the sensors needed to do every experiment in our chemistry lab books!





Additional Chemistry Sensors & Accessories

Radiation Monitor	RM-BTD	\$205
Student Radiation Monitor	SRM-BTD .	\$145
<i>Nuclear Radiation with Computers and Calculators</i> ...	NRCC	\$25
Dissolved Oxygen Probe	DO-BTA	\$191
Thermocouple	TCA-BTA	\$37
CO ₂ Gas Sensor	CO2-BTA ..	\$261
O ₂ Gas Sensor	O2-BTA	\$186
Instrumentation Amplifier	INA-BTA	\$51
Current Probe	DCP-BTA	\$37
NO ₃ ⁻ , Cl ⁻ , Ca ²⁺ , NH ₄ ⁺ Ion Selective Electrodes		\$165 each
Spectro Pro software (see page 10)	SP	\$50



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

TI-GRAPH LINK™ cable	see page 35
Graphical Analysis 3.0 software	GA
(See pp. 8-9 for more information.)	\$80

Our Chemistry lab books contain the following experiments:

Using Temperature Probes

- Endothermic and Exothermic Reactions
- Freezing and Melting of Water
- Another Look at Freezing Temperature
- Heat of Fusion of Ice
- Pressure-Temperature Relationships in Gases
- Fractional Distillation
- Evaporation and Intermolecular Attractions
- Vapor Pressure of Liquids
- Effect of Temperature on Solubility
- Using Freezing Point Depression to Find Molecular Weight
- Energy Content of Foods
- Energy Content of Fuels
- Hess's Law
- Heat of Combustion: Magnesium

Using a Gas Pressure Sensor

- Boyle's Law: Gas Pressure and Volume
- Pressure-Temperature Relationship
- Vapor Pressure of Liquids

Using a pH Sensor

- Household Acids and Bases
- Acid Rain
- Titration Curves of Strong and Weak Acids and Bases
- Acid-Base Titration
- Titration of a Diprotic Acid:
 - Identifying an Unknown
 - Acid Dissociation Constant, K_a
 - Time-Released Vitamin C Tablet¹
 - The Buffer in Lemonade¹
 - Phosphoric Acid Content in Soft Drinks¹
 - Microscale Acid-Base Titration

Using a Voltage Probe

- Establishing a Table of Reduction Potentials: Micro-Voltaic Cells
- Lead Storage Batteries

Using a Conductivity Probe

- Electrolytes and Non-Electrolytes
- Conductivity of Solutions:
 - The Effect of Concentration
 - Using Conductivity to Find an Equivalence Point

Using a Colorimeter

- Determining the Concentration of a Solution: Beer's Law
- Finding a Constant, K_c
- Rate Law Determination of the Crystal Violet Reaction
- Determining the Chlorine Content of Swimming Pool Water¹
- Determining the Quantity of Iron in a Vitamin Tablet¹

¹In *Chemistry with Calculators* only

↗ These experiments are available free on our web site!



BIOLOGY PACKAGES

Feel free to build your own package!

LabPro Biology Packages

Purchase one package per computer or calculator.

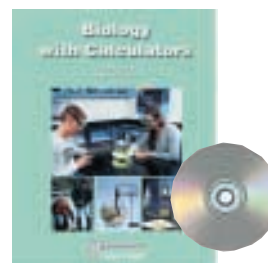
Interface and Sensors	Order Code	Starter Package BIO-STR	Deluxe Package BIO-DX
① LabPro Interface	LABPRO	\$220	\$220
② Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
③ Exercise Heart Rate Monitor	EHR-BTA	\$91	\$91
④ Gas Pressure Sensor	GPS-BTA	\$71	\$71
⑤ O ₂ Gas Sensor	O2-BTA	\$186	\$186
⑥ Conductivity Probe	CON-BTA		\$89
⑦ Colorimeter	COL-BTA		\$99
⑧ Dissolved Oxygen Probe	DO-BTA		\$191
⑨ pH Sensor	PH-BTA		\$74
⑩ EKG Sensor	EKG-BTA		\$142
⑪ Respiration Monitor Belt	RMB		\$58
⑫ CO ₂ Gas Sensor	CO2-BTA		\$261
⑬ CO ₂ -O ₂ Tee	CO2-TEE		\$5
	Package Price	\$597	\$1485

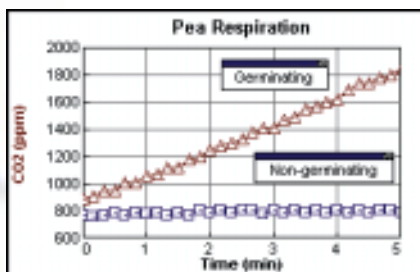
Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Biology with Computers or Biology with Calculators lab books 370 pages with 31 ready-to-use student experiments!	BWC-LP BWCALC	\$45 each

Deluxe Biology Package for LabPro



The Deluxe Package contains all the sensors needed to do every experiment in our biology lab books!





Measuring CO₂ levels of germinating and non-germinating peas.

Additional Biology Software

Spectro Pro software (see page 10) SP \$50



Monitoring EKG with LabPro, Logger Pro, and the EKG Sensor.



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

TI-GRAPH LINK™ cable see page 35
 Graphical Analysis 3.0 software GA \$80
 (See pp. 8-9 for more information.)

Our Biology lab books contain the following experiments:

Using a Gas Pressure Sensor

- Enzyme Action: Testing Catalase Activity (AP level)
- Transpiration (AP level)
- Cell Respiration (AP level)
- Sugar Fermentation
- Effect of Temperature on Fermentation
- Osmosis
- Lactaid Action
- Control of Human Respiration

Using a CO₂ Gas Sensor

- Cell Respiration (AP level)
- Respiration of Sugars by Yeast
- Effect of Temperature on Respiration
- Temperature of Cold-Blooded Organism
- Lactaid Action
- Photosynthesis and Respiration

Using a Colorimeter

- Photosynthesis (AP level)
- Effect of Alcohol on Biological Membranes
- Biological Membranes
- Population Dynamics

Using a Conductivity Probe

- Limitations on Cell Size
- Diffusion Through Membranes (AP level)
- Conducting Solutions
- Watershed Testing
- Physical Profile of a Lake

Using a Dissolved Oxygen Probe

- Interdependence of Plants and Animals
- Aerobic Respiration
- Dissolved Oxygen in Water
- Watershed Testing
- Physical Profile of a Lake
- Primary Productivity (AP level)

Using an EKG Sensor

- Monitoring EKG

Using an Exercise Heart Rate Monitor

- Heart Rate and Physical Fitness (AP level)
- Ventilation and Heart Rate

Using a pH Sensor

- Acids and Bases
- Interdependence of Plants and Animals
- Acid Rain
- Watershed Testing
- Physical Profile of a Lake

Using a Respiration Monitor Belt

- Control of Human Respiration

Using Temperature Probes

- Biodiversity and Ecosystems
- Energy in Food
- Aerobic Respiration
- Dissolved Oxygen in Water
- Watershed Testing
- Physical Profile of a Lake

Using an O₂ Gas Sensor

- Photosynthesis & Respiration
- Enzyme Action (AP level)
- Cell Respiration (AP level)
- Oxygen Gas and Human Respiration
- Effect of Temperature on Cold-Blooded Organisms

These experiments are available free on our web site!



PHYSICS PACKAGES

Feel free to build your own package!

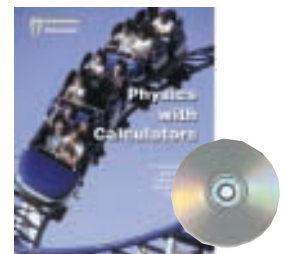
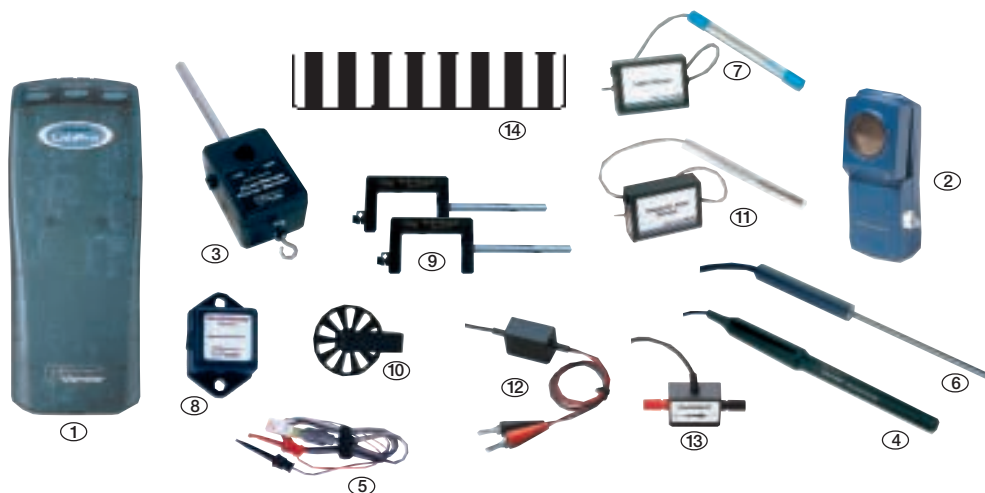
LabPro Physics Packages

Purchase one package per computer or calculator.

Interface and Sensors	Order Code	Starter Package PHY-STR	Deluxe Package PHY-DX
① LabPro Interface	LABPRO	\$220	\$220
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ Microphone	MCA-BTA	\$35	\$35
⑤ Voltage Probe	<i>(Included with LabPro)</i>	\$0	\$0
⑥ Stainless Steel Temperature Probe	TMP-BTA		\$29
⑦ Light Sensor	LS-BTA		\$45
⑧ Low-g Accelerometer	LGA-BTA		\$90
⑨ (2) Vernier Photogates	VPG-BTD		2@\\$43 = \$86
⑩ Super Pulley Attachment	SPA		\$20
⑪ Magnetic Field Sensor	MG-BTA		\$54
⑫ Differential Voltage Probe	DVP-BTA		\$35
⑬ (2) Current Probes	DCP-BTA		2@\\$37=\$74
⑭ Picket Fence	PF		\$5
	Package Price	\$418	\$839

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Physics with Computers or Physics with Calculators lab books 340 pages with 34 ready-to-use student experiments!	PWC-LP PWCALC	\$45 each

Deluxe Physics Package for LabPro



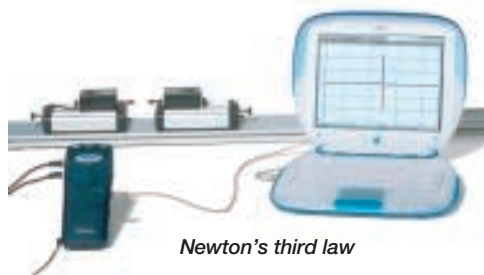
The Deluxe Package contains all the sensors needed to do 33 of the experiments in our physics lab books!



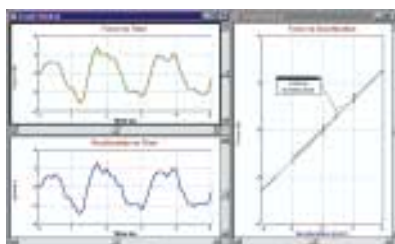


Additional Physics Sensors & Accessories

3-Axis Accelerometer	3D-BTA	\$199
25-g Accelerometer	ACC-BTA	\$91
Rotary Motion Sensor	RMS-BTD ...	\$195
Student Radiation Monitor	SRM-BTD ...	\$145
Radiation Monitor	RM-BTD	\$205
<i>Nuclear Radiation with Computers and Calculators</i> ..	NRCC	\$25
Digital Control Unit	DCU-BTD	\$61
Sound Level Meter	SLM-BTA	\$209



Newton's third law



Newton's second law



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

TI-GRAPH LINK™ cable	see page 35
Graphical Analysis 3.0 software	GA
	(See pp. 8-9 for more information.)

Our Physics lab books contain the following experiments:

Using Motion Detectors

- Graph Matching
- Modern Galileo Experiment¹
- Accelerated Motion²
- Determining g on an Incline
- Ball Toss

Air Resistance

- Simple Harmonic Motion
- Energy of a Tossed Ball
- Energy in Simple Harmonic Motion
- Work and Energy¹
- Momentum, Energy and Collisions
- Impulse and Momentum
- Back and Forth Motion

Using Force Sensors

- Newton's Second Law
- Newton's Third Law
- Static and Kinetic Friction
- Impulse and Momentum
- Work and Energy¹

Using Photogates

- Picket Fence Free Fall
- Projectile Motion
- Atwood's Machine
- Pendulum Periods

Using Accelerometers

- Bungee Jump Accelerations
- Newton's Second Law
- Centripetal Acceleration on a Turntable²
- Acceleration at the Playground²
- Accelerations in the Real World²

Using Microphones

- Sound Waves and Beats
- Tones, Vowels and Telephones¹
- Mathematics of Music¹
- Speed of Sound

Using Temperature Probes

- Newton's Law of Cooling

Using Current & Voltage Probes

- Ohm's Law
- Series and Parallel Circuits
- Electrical Energy

Using Voltage Probes

- Capacitors

Using a Magnetic Field Sensor

- Magnetic Field in a Coil
- Magnetic Field in a Slinky
- Magnetic Field of a Permanent Magnet

Using a Light Sensor

- Polarization of Light
- Light, Brightness and Distance

¹ In *Physics with Computers* only
² In *Physics with Calculators* only

These experiments are available free on our web site!



MIDDLE SCHOOL SCIENCE PACKAGES

Feel free to build your own package!

LabPro Middle School Science Packages

Purchase one package per computer or calculator.

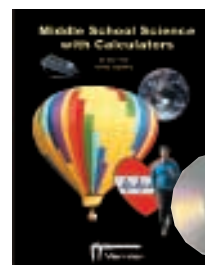
Interface and Sensors	Order Code	Starter Package MS-STR	Deluxe Package MS-DX
① LabPro Interface	LABPRO	\$220	\$220
② Motion Detector	MD-BTD	\$64	\$64
③ pH Sensor	PH-BTA	\$74	\$74
④ Voltage Probe	<i>(Included with LabPro)</i>	\$0	\$0
⑤ (2) Stainless Steel Temperature Probes	TMP-BTA	2@29 = \$58	2@29 = \$58
⑥ Light Sensor	LS-BTA	\$45	\$45
⑦ Exercise Heart Rate Monitor	EHR-BTA		\$91
⑧ Dual-Range Force Sensor	DFS-BTA		\$99
⑨ Conductivity Probe	CON-BTA		\$89
⑩ Gas Pressure Sensor	GPS-BTA		\$71
⑪ Magnetic Field Sensor	MG-BTA		\$54
	Package Price	\$461	\$848

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Middle School Science with Computers or Middle School Science with Calculators lab books 300 pages with 39 ready-to-use student experiments!	MSC-LP MSCALC	\$45 each

Deluxe Middle School Science Package for LabPro



The Deluxe Package contains all the sensors needed to do every experiment in our middle school science lab books!



MIDDLE SCHOOL SCIENCE PACKAGES



Additional Middle School Sensors & Accessories

Barometer.....	BAR-BTA	\$58
Relative Humidity Sensor	RH-BTA	\$67
Microphone	MCA-BTA	\$35



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

TI-GRAPH LINK™ cable	see page 35
Graphical Analysis 3.0 software	GA
<i>(See pp. 8-9 for more information.)</i>	

Our Middle School Science lab books contain the following experiments:

Using Temperature Probes

- A Hot Hand
- Heating of Land and Water
- The Greenhouse Effect
- Relative Humidity
- Absorption of Radiant Energy
- Schoolyard Study
- A Good Sock
- What Causes the Seasons?
- Solar Homes
- Boiling Temperature of Water
- Freezing Temperature of Water
- How Low Can You Go?
- A Good Cold Pack
- A Water Field Study
- Cooling Rates: Shaq vs. Susie

Using Motion Detectors

- Ocean Floor Mapping
- Graphing Your Motion
- Velocity
- The Indy 100
- Crash Dummies
- Falling Objects
- A Speedy Slide¹

Using a Force Sensor

- Friction
- First-Class Levers
- Pulleys
- Buoyancy

Using a Conductivity Probe

- Water Hardness Study
- Diffusion: How Fast?
- A Water Field Study

Using a pH Sensor

- Soil Study
- A Water Field Study

Using a Gas Pressure Sensor

- Get a Grip!
- Fun with Pressure
- Yeast Beasts in Action

Using an Exercise Heart Rate Monitor

- Heart Rate and Body Position
- Heart Rate and Exercise

Using a Light Sensor

- Reflectivity of Light
- Schoolyard Study

Using a Magnetic Field Sensor

- Mapping a Magnetic Field
- Electromagnets

Using a Voltage Probe

- Lemon "Juice"

¹ In *Middle School Science with Calculators* only

These experiments are available free on our web site!

WATER QUALITY PACKAGES

LabPro Water Quality Packages

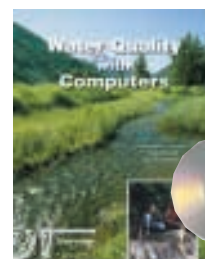
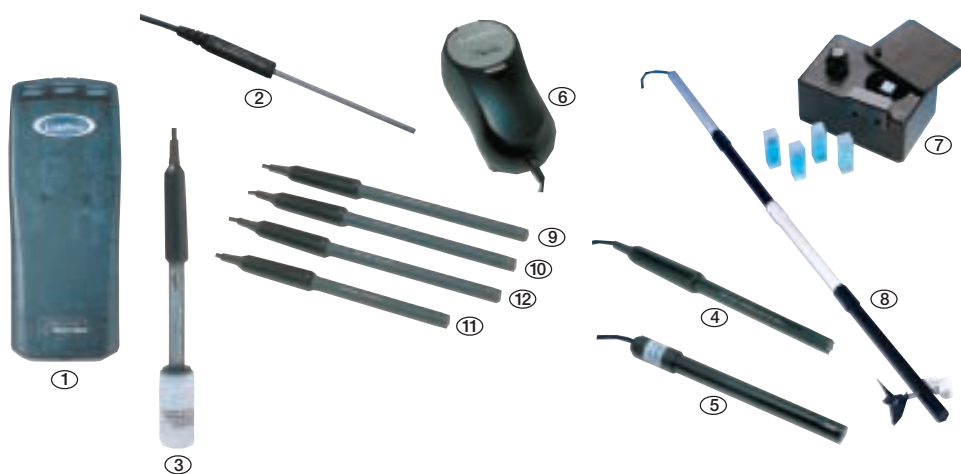
Purchase one package per computer or calculator.

Feel free to build your own package!

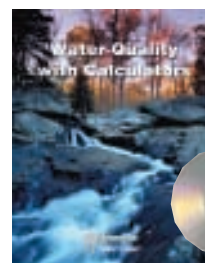
Interface and Sensors	Order Code	Starter Package WQ-STR	Deluxe Package WQ-DX
① LabPro Interface	LABPRO	\$220	\$220
② Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
③ pH Sensor	PH-BTA	\$74	\$74
④ Dissolved Oxygen Probe	DO-BTA	\$191	\$191
⑤ Conductivity Probe	CON-BTA	\$89	\$89
⑥ Turbidity Sensor	TRB-BTA	\$99	\$99
⑦ Colorimeter	COL-BTA		\$99
⑧ Flow Rate Sensor	FLO-BTA		\$129
⑨ Ammonium Ion-Selective Electrode	NH4-BTA		\$165
⑩ Calcium Ion-Selective Electrode	CA-BTA		\$165
⑪ Chloride Ion-Selective Electrode	CL-BTA		\$165
⑫ Nitrate Ion-Selective Electrode	NO3-BTA		\$165
	Package Price	\$699	\$1558

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Water Quality with Computers or Water Quality with Calculators lab books 230 pages with 16 ready-to-use student experiments!	WQC-LP WQCALC	\$45 each

Deluxe Water Quality Package for LabPro



The Deluxe Package contains all the sensors needed to do every experiment in our water quality lab books!

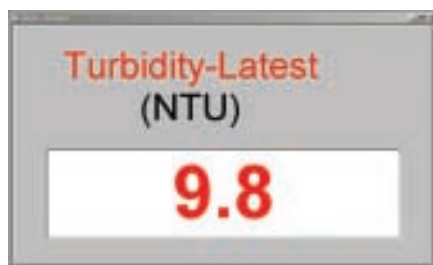


WATER QUALITY PACKAGES



Additional Water Quality Sensors & Accessories

- Extra-Long Temperature Probe TPL-BTA .. \$70
- Water Depth Sampler WDS \$59
- Light Sensor LS-BTA \$45
- Vernier Neck Strap (set of 5) VNS-5 \$15



Turbidity meter.

Our Water Quality manuals contain the following water quality tests:

Using a Temperature Probe
Temperature

Using a pH Sensor
pH
Alkalinity

Using a Turbidity Sensor
Turbidity

Using a Dissolved Oxygen Probe
Dissolved Oxygen
Biochemical Oxygen Demand

Using a Colorimeter
Phosphates, Ortho- and Total
Nitrate

Using ISE Probes
Nitrate
Ammonium Nitrogen
Calcium and Water Hardness
Chloride and Salinity

Using a Conductivity Probe
Total Dissolved Solids

Using a Flow Rate Sensor
Flow Rate and Stream Discharge

Water tests requiring no sensor
Total Solids
Fecal Coliform
Total Water Hardness

Water-Quality Index Tests
Temperature
pH
Turbidity
Total Solids
Dissolved Oxygen
Biochemical Oxygen Demand
Phosphates, Ortho- and Total
Fecal Coliform
Nitrate

These experiments are available free on our web site!



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

- TI-GRAPH LINK™ cable see page 35
- Graphical Analysis 3.0 software GA \$80
(See pp. 8-9 for more information.)

Feel free to build your own package!

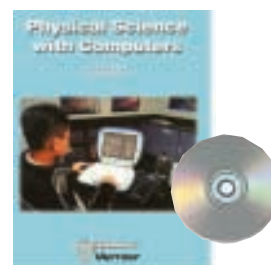
LabPro Physical Science Packages

Purchase one package per computer or calculator.

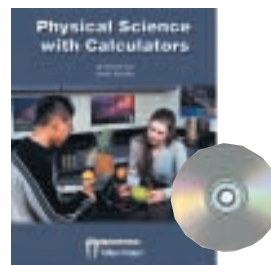
Interface and Sensors	Order Code	Starter Package PS-STR	Deluxe Package PS-DX
① LabPro Interface	LABPRO	\$220	\$220
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ pH Sensor	PH-BTA	\$74	\$74
⑤ Voltage Probe	<i>(Included with LabPro)</i>	\$0	\$0
⑥ (2) Stainless Steel Temperature Probes	TMP-BTA	2@29 = \$58	2@29 = \$58
⑦ Light Sensor	LS-BTA		\$45
⑧ Conductivity Probe	CON-BTA		\$89
⑨ Gas Pressure Sensor	GPS-BTA		\$71
⑩ Magnetic Field Sensor	MG-BTA		\$54
	Package Price	\$515	\$759

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Physical Science with Computers or Physical Science with Calculators lab books 300 pages with 40 ready-to-use student experiments!	PSC-LP PSCALC	\$45 each

Deluxe Physical Science Package for LabPro

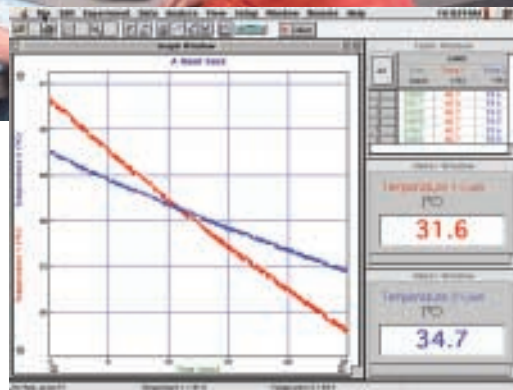


The Deluxe Package contains all the sensors needed to do every experiment in our physical science lab books!





*A Good Sock:
Comparing insulation
of cotton and wool.*



Additional Physical Science Sensors & Accessories

Microphone	MCA-BTA	\$35
Low-g Accelerometer	LGA-BTA	\$90
Student Radiation Monitor	SRM-BTD	\$145
Radiation Monitor	RM-BTD	\$205



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

TI-GRAPH LINK™ cable	see page 35
Graphical Analysis 3.0 software	GA
	(See pp. 8-9 for more information.)

Our Physical Science lab books contain the following experiments:

Using Temperature Probes

- Temperature Probe Response Time
- Boiling Temperature of Water
- Freezing and Melting of Water
- Evaporation of Alcohols
- Endothermic and Exothermic Reactions
- Neutralization Reactions
- Mixing Warm and Cold Water
- Heat of Fusion
- Energy Content of Fuels
- Energy Content of Foods
- Absorption of Radiant Energy
- An Insulated Cola Bottle
- A Good Sock
- Insulation Angle
- Solar Homes and Heat Sinks

Using a Conductivity Probe

- Conducting Solutions
- Conductivity of Saltwater
- Acid Strengths

Using a Force Sensor

- Frictional Forces
- First-Class Levers
- Pulleys
- An Inclined Plane

Using a Light Sensor

- Reflectivity of Light
- Polaroid Filters
- How Bright is the Light?

Using a Magnetic Field Sensor

- Electromagnets: Winding Things Up
- Magnetic Field Explorations

Using a pH Sensor

- Household Acids and Bases
- Acid Rain

Using a Gas Pressure Sensor

- Gas Pressure and Volume
- Gas Temperature and Pressure
- Fun with Pressure

Using a Voltage Probe

- Lemon "Juice"
- Lead Storage Batteries

Using a Motion Detector

- Velocity
- It's Race Day
- Momentum: A Crash Lesson
- Newton's Second Law
- Graphing Your Motion
- Falling Objects

These experiments are available free on our web site!



EARTH SCIENCE PACKAGES

Feel free to build your own package!

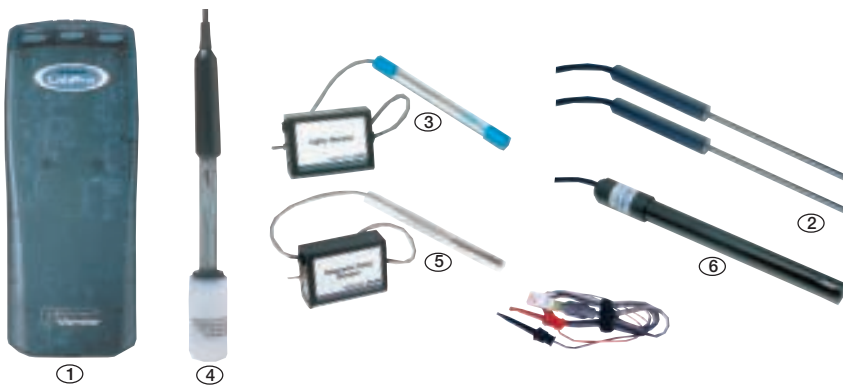
LabPro Earth Science Packages

Purchase one package per computer or calculator.

Interface and Sensors	Order Code	Starter Package ES-STR	Deluxe Package ES-DX
① LabPro Interface	LABPRO	\$220	\$220
② (2) Stainless Steel Temperature Probes	TMP-BTA	2@29 = \$58	2@29 = \$58
③ Light Sensor	LS-BTA	\$45	\$45
④ pH Sensor	PH-BTA	\$74	\$74
⑤ Magnetic Field Sensor	MG-BTA		\$54
⑥ Conductivity Probe	CON-BTA		\$89
	Package Price	\$397	\$529

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Middle School Science with Computers or Middle School Science with Calculators lab books 300 pages with 40 ready-to-use student experiments!	MSC-LP MSCALC	\$45 each

Deluxe Earth Science Package for LabPro



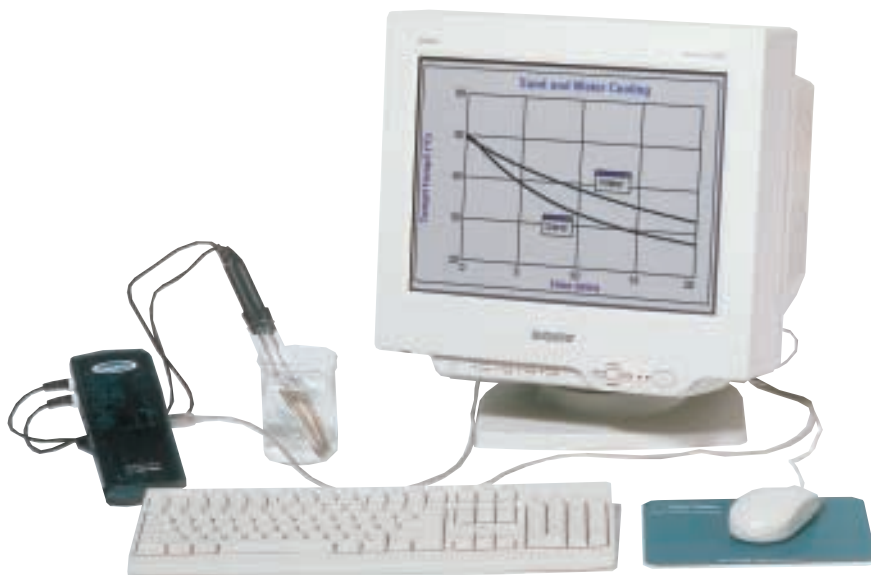


Heating of land and water.

Our Middle School Science lab books contain the following earth science experiments:

- Using Temperature Probes**
 - Heating of Land and Water
 - The Green House Effect
 - Relative Humidity
 - Absorption of Radiant Energy
 - Schoolyard Study
 - A Good Sock
 - What Causes the Seasons?
 - Solar Homes
 - The Freezing Temperature of Water
 - A Water Field Study
- Using a pH Sensor**
 - Soil Study
 - A Water Field Study
- Using a Light Sensor**
 - Reflectivity of Light
 - Schoolyard Study
- Using a Conductivity Probe**
 - A Water Field Study
 - Water Hardness Study
- Using a Magnetic Field Sensor**
 - Mapping a Magnetic Field

This experiment is available free on our web site!



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

- TI-GRAPH LINK™ cable see page 35
- Graphical Analysis 3.0 software GA \$80
(See pp. 8-9 for more information.)

Additional Earth Science Sensors & Accessories

- Relative Humidity Sensor RH-BTA \$67
- Barometer BAR-BTA \$58



MATH PACKAGES

Feel free to build your own package!

LabPro Math Packages

Purchase one package per computer or calculator.

Interface and Sensors	Order Code	Starter Package MT-STR	Deluxe Package MT-DX
① LabPro Interface	LABPRO	\$220	\$220
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
⑤ Voltage Probe	<i>(Included with LabPro)</i>	\$0	\$0
⑥ Microphone	MCA-BTA		\$35
⑦ Gas Pressure Sensor	GPS-BTA		\$71
⑧ Light Sensor	LS-BTA		\$45
⑨ pH Sensor	PH-BTA		\$74
	Package Price	\$412	\$624

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Real-World Math with Computers lab book	RWC-LP	\$45
Real-World Math with CBL 2™ and LabPro® lab book 222 pages with 29 ready-to-use student experiments!	RWCALC	\$25

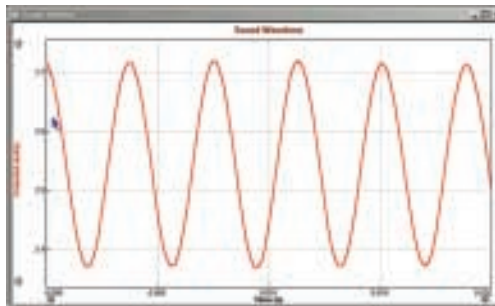
Deluxe Math Package for LabPro



The Deluxe Package contains all the sensors needed to do every experiment in our math lab books!



Studying sound waveforms.



Sound waveform.

Our Math lab books contain the following experiments:

Using Motion Detectors

- Straight Line Distance Graphs
- Newton's Second Law
- The Linear Force Relation for a Rubber Band
- Position and Time for a Cart on a Ramp
- Height and Time for a Bouncing Ball
- Definition of Rate
- Interpreting Graphs
- Applications of the Distance Formula
- The Pattern of Rebound Heights
- Pendulum Motion
- Damped Harmonic Motion
- Describing Data With Statistical Plots
- Solving a System of Linear Equations
- Period and Length of a Simple Pendulum¹
- Piecewise Defined Functions²
- Plotting an Ellipse²
- Parametric Plots²

Using Force Sensors

- Linear Relationship between Weight and Quantity
- Volume and Weight
- Newton's Second Law
- The Linear Force Relation for a Rubber Band

Using Temperature Probes

- Mixing Liquids of Different Temperatures
- How Hot Objects Cool
- Describing Data with Statistics

Using Voltage Probes

- Charging a Capacitor

Using Microphones

- Sound Waveform Models

Using a Gas Pressure Sensor

- Linear Relationship between Water Depth and Pressure
- Rates of Pressure Increase
- The Inverse Relationship between Pressure and Volume

Using a Light Sensor

- Distance and Intensity
- Periodic Phenomena

Using a pH Sensor

- The Exponential pH Change
- An Application of the Logistic Function

¹ In *Real-World Math with Computers* only

² In *Real-World Math with CBL 2 and LabPro* only

These experiments are available free on our web site!



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

- TI-GRAPH LINK™ cable see page 35
 - Graphical Analysis 3.0 software GA \$80
- (See pp. 8-9 for more information.)



COMPREHENSIVE PACKAGE

Feel free to build your own package!

LabPro Comprehensive Package

Purchase one package per computer or calculator.

Interface and Sensors	Order Code	Deluxe Package CP-DX
① LabPro Interface	LABPRO	\$220
② Stainless Steel Temperature Probe	TMP-BTA	\$29
③ Light Sensor	LS-BTA	\$45
④ Voltage Probe	<i>(Included with LabPro)</i>	\$0
⑤ Motion Detector	MD-BTD	\$64
⑥ Dual-Range Force Sensor	DFS-BTA	\$99
⑦ Microphone	MCA-BTA	\$35
⑧ Low-g Accelerometer	LGA-BTA	\$90
⑨ Magnetic Field Sensor	MG-BTA	\$54
⑩ Gas Pressure Sensor	GPS-BTA	\$71
⑪ pH Sensor	PH-BTA	\$74
⑫ Conductivity Probe	CON-BTA	\$89
⑬ Colorimeter	COL-BTA	\$99
⑭ Dissolved Oxygen Probe	DO-BTA	\$191
⑮ O ₂ Gas Sensor	O2-BTA	\$186
⑯ Exercise Heart Rate Monitor	EHR-BTA	\$91
	Package Price	\$1399

Software and Lab Books	Order Code	Price
Logger Pro software (<i>Windows and Macintosh</i>) Buy just one copy! A free site license is included for your school or college department, and your students' own computers!	LP	\$65
Chemistry with Computers or Chemistry with Calculators lab books	PWC-LP PWCALC	\$45 each
Biology with Computers or Biology with Calculators lab books	BWC-LP BWCALC	\$45 each
Physics with Computers or Physics with Calculators lab books	PWC-LP PWCALC	\$45 each
Physical Science with Computers or Physical Science with Calculators lab books	PSC-LP PSCALC	\$45 each
Water Quality with Computers or Water Quality with Calculators lab books	WQC-LP WQCALC	\$45 each
Middle School Science with Computers or Middle School Science with Calculators lab books	MSC-LP MSCALC	\$45 each
Real-World Math with Computers or Real-World Math with CBL 2™ and LabPro® lab books	RWC-LP RWCALC	\$45 \$25



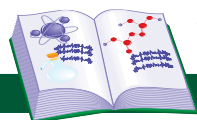
Deluxe Comprehensive Package for LabPro



Calculator Users:

If you are using LabPro with calculators to collect data, we strongly recommend:

- TI-GRAPH LINK™ cable see page 35
 - Graphical Analysis 3.0 software GA \$80
- (See page 8-9 for more information.)*



VERNIER LAB BOOKS

Vernier Lab Books

Each Vernier lab book includes:

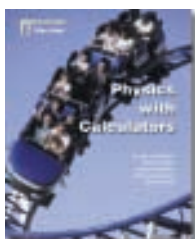
- Complete student experiments with materials list, step-by-step instructions, data tables, and questions.
- Teacher Information for each experiment, with complete directions for setting up experiments, helpful hints, and sample graphs and data.
- Word-processing files of the student sections on a CD so that any experiment may be easily edited to your specifications. Each CD includes *both* the computer and calculator version of each student experiment!
- The packages shown on pp. 12-29 have a complete list of experiments (according to sensor) for each book.



- The *Computer* versions of the books have specific instructions for using Macintosh or Windows computers with LabPro, ULI, or Serial Box Interface.
- The *Calculator* versions of the books include instructions for using TI Graphing Calculators with LabPro or CBL 2.
- Each book is approximately 250-300 pages in length.

Original CBL Users:

If you are using the original CBL, purchase the *CBL* book versions. (See bottom of page 31.)



Physics with Computers

by Kenneth Appel, John Gastineau, Clarence Bakken, and David Vernier

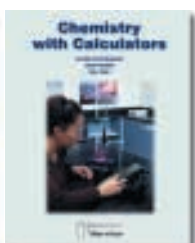
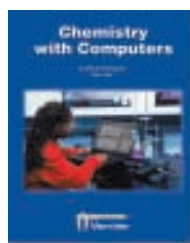
(Order Code PWC-LP, \$45)

Physics with Calculators

by John Gastineau, Kenneth Appel, Clarence Bakken, Richard Sorensen and David Vernier

(Order Code PWCALC, \$45)

Each book has 34 experiments in mechanics, sound, light, electricity, and magnetism. The complete table of contents is shown on page 17. Experiments are included for eleven Vernier physics sensors.



Chemistry with Computers

by Dan Holmquist and Donald Volz

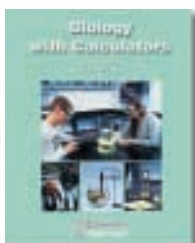
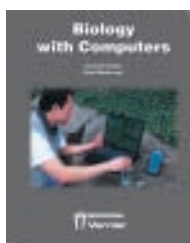
(Order Code CWC-LP, \$45)

Chemistry with Calculators

by Dan Holmquist, Jack Randall and Donald Volz

(Order Code CWCALC, \$45)

These books have more than 30 experiments in thermochemistry, gas laws, acid-base reactions, equilibrium, electrochemistry, electrolytes, states of matter, and more. The complete table of contents is shown on page 13. Experiments are included for the Gas Pressure Sensor, Temperature Probe, pH Sensor, Conductivity Probe, Colorimeter, and Voltage Probe.



Biology with Computers

by David Masterman and Scott Holman

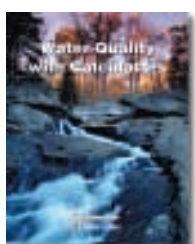
(Order Code BWC-LP, \$45)

Biology with Calculators

by David Masterman and Scott Holman

(Order Code BWCALC, \$45)

Each book has 31 experiments in cell respiration, photosynthesis, membrane diffusion, osmosis, human physiology, transpiration, fermentation, and other important biology concepts. The complete table of contents is shown on page 15. Experiments are included for 12 Vernier biology sensors. This book supports seven AP Biology lab activities.



Water Quality with Computers

by Robyn L. Johnson, Scott Holman and Dan D. Holmquist

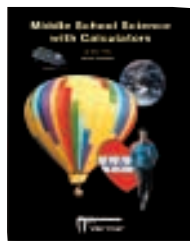
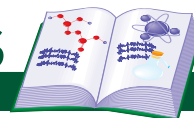
(Order Code WQC-LP, \$45)

Water Quality with Calculators

by Robyn L. Johnson, Scott Holman and Dan D. Holmquist

(Order Code WQCALC, \$45)

Each book has 16 water quality tests, including pH, total dissolved solids, dissolved oxygen, BOD, flow rate, turbidity, nitrates, and phosphates. All nine tests in the Water Quality Index (WQI) are supported. Each book has water quality tests for eleven Vernier water quality sensors. The complete list of tests is shown on page 21.



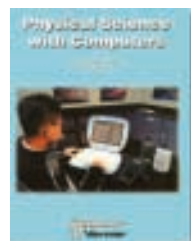
Middle School Science with Computers

by Donald Volz and Sandy Sapatka
(Order Code MSC-LP, \$45)

Middle School Science with Calculators

by Donald Volz and Sandy Sapatka
(Order Code MSCALC, \$45)

These are our newest books written specifically for students in grades 6-8. They each contain 39 experiments in earth science, life science, and physical science. The complete table of contents by sensor is shown on page 19. Each book has experiments for ten Vernier middle school sensors. Your students will really enjoy doing these well-written and well-tested science experiments!



Physical Science with Computers

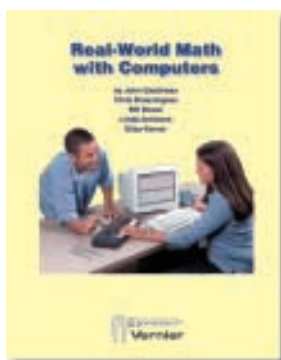
by Donald Volz and Sandy Sapatka
(Order Code PSC-LP, \$45)

Physical Science with Calculators

by Donald Volz and Sandy Sapatka
(Order Code PSCALC, \$45)

These books each have 40 ready-to-use experiments for physical science (middle school through grade 10). The complete table of contents is shown on page 23. Experiments are included for 12 Vernier physical science sensors in chemistry and physics. These experiments are perfect for introductory physical science and integrated science classes!

NEW!



Real-World Math with Computers

by John Gastineau, Chris Bruningsen, Bill Bower, Linda Antinone, and Elisa Kerner
(Order Code RWC-LP, \$45)

Real-World Math with CBL 2™ and LabPro®

by John Gastineau, Chris Bruningsen, Bill Bower, Linda Antinone, and Elisa Kerner
(Order Code RWCALC, \$25)

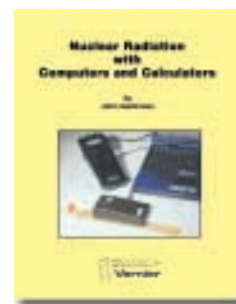
These manuals contain 29 or more activities that explore real-world applications of math concepts. Concepts from algebra through calculus are covered. Activities cover a wide variety of topics, including linear, quadratic, and periodic functions, statistics, systems of equations, and many more. A variety of sensors are used, including motion detectors, temperature sensors, force sensors, microphones, etc.

Nuclear Radiation with Computers and Calculators

by John Gastineau

(Order Code NRCC, \$25)

This new book has six experiments written for the Vernier Radiation Monitor and Student Radiation Monitor. Each of the six experiments has a computer version (for LabPro or ULI), and a calculator version (for LabPro or CBL 2). The Nuclear Radiation CD included with the book contains the word-processing files for all student experiments. Experiments include *Distance and Radiation*, *Counting Statistics*, *Half-Life Measurement*, *Background Radiation Sources*, *Counting Statistics*, and *Alpha, Beta, and Gamma*.



Lab Books Written Specifically for the Original CBL

<i>Physics with CBL</i>	PWCBL	\$45
<i>Chemistry with CBL</i>	CWCBL	\$45
<i>Biology with CBL</i>	BWCBL	\$45
<i>Water Quality with CBL</i>	WQCBL	\$45
<i>Physical Science with CBL</i>	PSCBL	\$45



OTHER PHYSICS CURRICULUM FOR *LOGGER PRO*

Tools for Scientific Thinking

by David Sokoloff and Ronald Thornton

Tools for Scientific Thinking consists of two curriculum guides: *Motion and Force* and *Heat and Temperature*. Each guide is suitable for either high school or introductory college laboratories. A detailed Teacher's Guide and a disk of word processing files are also included.

Motion and Force

The Motion and Force laboratory guide contains five units. A Motion Detector and a force sensor are used.

Motion and Force, unbound (226 pages)

for use with <i>Logger Pro</i>	TSTM-LP	\$35
for use with older Macintosh software	TSTM-M	\$35

Heat and Temperature

The Heat and Temperature laboratory guide contains four units. Two temperature probes are required. A Heat Pulser is required for approximately half of the investigations. (Contact Vernier for details on the Heat Pulser.)

Heat and Temperature, unbound (180 pages)

for use with <i>Logger Pro</i>	TSTH-LP	\$35
for use with older Macintosh software	TSTH-M	\$35

Activity Based Physics High School CD

Select portions of the *RealTime Physics*, *Workshop Physics*, and *Tools for Scientific Thinking* curricula have been adapted for high school use. The Activity Based Physics High School CD uses Vernier interfaces and *Logger Pro* software to allow students to learn about mechanics, thermal physics, electricity, magnetism, wave motion, sound, and nuclear radiation with hands-on activities.



Interactive Lecture Demonstration worksheets, assessment examinations, sample homework assignments, video materials, and teacher guides supplement the curricular materials. Purchase of a CD includes a 5-year license that allows teachers to reprint or modify materials for distribution to students at their school.

The Activity Based Physics CD includes:

- Curricular Materials
- *Logger Pro* Experiment Files
- QuickTime™ Movies with VideoPoint Lite™
- Instructor Materials

These student-centered materials have been created as part of the Activity Based Physics, NSF-sponsored, High School Institute program (Grant No. ESI-9819626).

Activity Based Physics High School CD (Five-Year License)

Order Code ABP-CD (Available for high schools only) \$200

Amusement Park Physics

by Nathan Unterman

This book provides a wealth of information about planning an amusement park study program in your classroom. Included are student sheets for activities that can be performed at amusement parks or carnivals. Activities and sample data are provided for those who do not have access to an amusement park.

Order Code APP \$23

MBL Interactive Lecture Demonstrations: Motion, Force and Energy (Includes Video)

by Ronald Thornton and David Sokoloff

This package helps you make lectures more effective by increasing student involvement. The ILDs consist of a sequence of conceptually simple physics experiments using the *Tools for Scientific Thinking* and *Logger Pro* MBL tools. Students are actively engaged by using a learning cycle that includes written prediction of the results of an experiment, small group discussions, observation of the physical event in real time with the MBL tools, and comparison of observations with predictions.

It includes materials for five 40- or 50-minute sessions of ILDs, including

- Master copies of student prediction sheets (on paper and disk).
- Teacher Presentation notes (with procedures and questions).
- Teacher's Guide.
- A videotape showing presentations at Tufts University of four of the five ILD sequences.

Mechanics Interactive Lecture Demonstration Package

with videotape and two disks (Macintosh and Windows) ILD \$30

Wiley & Sons Physics Curriculum

The following curricula, which support Vernier equipment, are available from John Wiley & Sons publishers. Contact your John Wiley representative or check out their home page at www.wiley.com/college.

RealTime Physics Activity Guide



RealTime Physics is a 3-volume workbook designed to enhance conceptual learning while developing quantitative skills in an introductory physics laboratory. Intended for use in a lab equipped with MBL (microcomputer-based lab) tools (electronic sensors, microcomputer interface, and software for data collection and analysis).

RealTime Physics—Mechanics

by David R. Sokoloff, Ron Thornton and Priscilla Laws

Includes experiments exploring kinematics, Newton's laws of motion, passive forces, gravitational forces, momentum, collisions, energy, and projectiles.

RealTime Physics—Heat and Thermodynamics

by David R. Sokoloff, Ron Thornton and Priscilla Laws

Includes labs exploring thermal equilibrium, thermal energy flow, specific heat capacity, changes of phase, gas laws, and heat engines.

RealTime Physics—Electric Circuits

by David R. Sokoloff, Priscilla Laws and Ron Thornton

Includes experiments exploring current and voltage in simple DC circuits, Ohm's and Kirchhoff's laws, capacitors and RC circuits, inductors, and simple AC circuits.

Workshop Physics

by Priscilla Laws



The Workshop Physics project has developed curricular materials that allow instructors at the college and high school levels to teach introductory physics courses without lectures. The Workshop Physics Activity Guide serves as the foundation for a two-semester, calculus-based introductory physics course that is activity centered.



Data Collection with TI Graphing Calculators

Data collection with a TI Graphing Calculator is easy, cost effective, powerful, and fun! Students can collect data with many different sensors in a multitude of ways within or outside the classroom. For example, in a classroom they can use a pH Sensor to perform acid-base titrations, an Oxygen Gas Sensor to study cell respiration, or a Motion Detector to study free fall and terminal velocity. Outside the classroom, environmental science students can monitor water quality or physics students can study amusement park rides. With over 40 different sensors, a world of data collection opportunities is possible!



Vernier LabPro® or CBL 2™?



You have a choice of data collection interfaces—the Vernier LabPro or the Texas Instruments CBL 2. Both of these devices were developed jointly by Vernier and Texas Instruments. As you would expect, there are similarities between LabPro and CBL 2, including the case, buttons, cradle, built-in user program for TI graphing calculators, Flash memory, and support for stand-alone use. Of course there are differences, the biggest being that LabPro is designed for use with either computers or calculators, while CBL 2 is primarily a calculator interface. Calculator users may choose LabPro, since it has more ports, higher resolution, and offers more flexibility. The chart below provides a comparison of these interfaces.



Collecting data with either LabPro or CBL 2 is quick and easy. Simply plug in your sensors, run the DataMate calculator program, and you are ready to collect and analyze data! (Photogates and radiation monitors require separate programs.) When you plug in our auto-ID sensors, calibrations are loaded automatically. A Quick Setup button is included for remote data collection and simpler data-logging methods. We help you get started with your curriculum too. We have extensive lab books for biology, chemistry, physics, math, middle school science, and water quality—225 experiments in all!

	LabPro	CBL 2
Channels	4 analog and 2 digital/sonic	3 analog and 1 digital/sonic
Compatible Vernier analog sensors	all (for example, pH, conductivity, force, etc.)	all (for example, pH, conductivity, force, etc.)
Compatible Vernier digital sensors	motion, photogate (2), radiation, rotary motion	motion, photogate (1), radiation, rotary motion
Analog output channel	Yes	No
Digital output channels	Yes (2)	Yes (1)
Maximum sample rate	50,000 samples/second	50,000 samples/second
Internal data storage	12,000 points	12,000 points
Resolution	12 bit	10 bit
Computer connections	serial, USB, calculator link port	calculator link port (requires TI-GRAPH LINK)
Compatible calculators	TI-73/82/83/83 Plus/86/89/92/92 Plus	TI-73/82/83/83 Plus/86/89/92/92 Plus
Built-in calculator program	Yes (DataMate)	Yes (DataMate)
Stand-alone use	Yes	Yes
Sensors included	voltage	temperature, light, voltage
Additional included items	computer cables (both serial and USB), AC power supply, calculator link cable, calculator cradle, and user's manual	calculator link cable, calculator cradle, batteries, and user's manual
Cost	\$220	\$166



CALCULATOR DATA COLLECTION

CBL 2 (CBL2, \$166)



The CBL 2 is an easy-to-use, powerful, and inexpensive data collection tool. You can start collecting data right out of the box with CBL 2 in four easy steps:

1. Transfer the built-in user program from the CBL 2 to your calculator with a single button push.
2. Run the program.
3. Plug in one of our auto-ID sensors.
4. Begin collecting data.

More than 40 sensors, such as our Motion Detector, Dual-Range Force Sensor, pH Sensor, or Oxygen Gas Sensor, can be connected to the CBL 2. Since the CBL 2 is portable and battery powered, you can take it out of the classroom for experiments such as measuring accelerations on amusement park rides, or monitoring the temperature, dissolved oxygen, and pH of a lake or stream. Within the classroom, you can use the CBL 2 and a graphing calculator as a low-cost alternative to computers for collecting and analyzing real-world data. The CBL 2 System includes the CBL 2 interface, a stainless steel temperature probe, light probe, voltage probe, calculator cradle, short link cable, batteries, user's guide, and a TI Resource CD.

Calculator-Based Ranger™ (CBR, \$95)



If you teach math, physical science or physics, and don't have a LabPro, CBL 2 or CBL, you may want to consider the CBR™—the least expensive and easiest way to collect motion data. The CBR is unique because it collects distance,

velocity, and acceleration data while connected directly to a TI Graphing Calculator, so you don't need a data-collection interface. Equally important is that the CBR contains built-in programs. You send programs directly from the CBR to the calculator, so you don't need a TI-GRAPH LINK.

CBR Workbooks

The CBR comes with an introductory workbook of five activities. Two additional workbooks are available:

Math and Science in Motion: Activities for the Middle School *by Chris Brueningsen, Elisa Kerner and Bill Bower*

Contains twelve activities for the TI-82, TI-83, or TI-83 Plus with the CBR. Students explore graphs of distance vs. time as they move toward and away from the CBR. Students also study bouncing objects, acceleration due to gravity, and pendulum motion. (Order Code TI-MCBBR, \$14)

Modeling Motion: High School Math Activities with the CBR *By Linda Antinone, Sam Gough and Jill Gough*

Contains fifteen activities using the CBR with the TI-82, TI-83, or TI-83 Plus. Activities in algebra, pre-calculus, and physics include linear, quadratic, and exponential regression and projectile motion. (Order Code TI-HCBBR, \$14)

Calculators

Graphing calculator data collection is possible with the TI-73, TI-82, TI-83, TI-83 Plus, TI-86, TI-89, TI-92, and TI-92 Plus. A complete list of calculators, order codes and prices appears on page 35. We recommend the following calculators:

TI-83 Plus Graphing Calculator (TI-83PL, \$98)



The TI-83 Plus is the best choice for use in high school or college science and math courses. The TI-83 Plus contains Flash ROM technology, which includes 24K of RAM and 160K of data archive memory. The data archive can be used to store and execute calculator software applications. The Flash ROM enables the calculator to be electronically upgraded. The calculator can be purchased in a Teacher Pack of 10 TI-83 Plus Graphing Calculators, 10 guidebooks, a poster, 10 unit-to-unit cables, and batteries (order code TI-83PLTP, \$980).

TI-73 Graphing Calculator (TI-73, \$88)

The TI-73 is the best choice for middle school students. A simple keyboard makes it easier for younger students to use. The TI-73 is electronically upgradeable. You can also purchase a Teacher Pack of 10 TI-73 Graphing Calculators, 3 guidebooks, a poster, 10 unit-to-unit cables, and batteries (order code TI-73TP, \$880).

NEW!

TI-83 Plus Silver Edition (TI-83PSE, \$129)



This new calculator is an upgraded TI-83 Plus calculator. It has almost ten times the Flash ROM and 2½ times the processing speed of a TI-83 Plus. The calculator comes preloaded with applications, such as a periodic table, science tools, and an organizer. Also available is a Teacher Pack of 10 TI-83 Plus Silver Edition Graphing Calculators, 10 guidebooks, a poster, 10 unit-to-unit cables, 10 TI-GRAPH LINK for Windows cables, and batteries (order code TI-83SETP, \$1290).

Projecting Calculator Screens

ViewScreens™ (See page 35 for order codes and prices)

The Texas Instruments ViewScreen makes it possible to project the image of the calculator display with an overhead projector. The ViewScreen comes with a projection panel that fits on top of an overhead projector, and a modified calculator that attaches to the projection panel. ViewScreens are available for TI-73, TI-83 Plus Silver Edition, TI-86, TI-89, TI-92, and TI-92 Plus calculators. Note: The TI-83 Plus Silver Edition ViewScreen replaces the ViewScreen for the TI-83 and TI-83 Plus.

TI-Presenter™ (TI-PRE, \$297)

The TI-Presenter displays the calculator image on a TV screen or with projection systems like those used with computers. The Presenter works with all models of ViewScreen calculators. ViewScreen calculators are not included and must be purchased separately (see page 35).

Vernier AC Adapter

CBL 2 runs on batteries, but AC power saves on battery costs when collecting data in the classroom. AC power can be provided with the Vernier AC Adapter (Order Code IPS, \$10).



Connecting Calculators and Computers

To connect a TI Graphing Calculator to a computer, you will need a TI-GRAPH LINK cable and computer software. The software you choose will depend upon the application you have in mind. You have two choices for software:

- **TI-GRAPH LINK** software is used to transfer programs between a computer and a calculator. It can also be used to capture the image of the calculator display. This software is included with some of the packages described below or it can be downloaded from the TI web site (www.education.ti.com).
- The Vernier **Graphical Analysis 3.0** program is used to easily transfer data from the TI Graphing Calculator to the computer. For more information, see pp. 8-9.

In either case, you will need a TI-GRAPH LINK cable. The following TI-GRAPH LINK products are available. **Note:** Any of the cables listed below can be used with Graphical Analysis 3.0.

TI-GRAPH LINK™ Package (TI-GL, \$55)

This hardware/software package includes everything you need to connect a TI Graphing Calculator to the modem or serial port on a Macintosh and/or a PC computer. Macintosh and Windows TI-GRAPH LINK software and user's manuals are provided on a CD.



TI-GRAPH LINK Cable for Macintosh (GLC-MAC, \$29)

This is a TI-GRAPH LINK cable and adapter for Macintosh computers with modem or printer ports. This product does not contain the TI-GRAPH LINK software or manuals.

TI-GRAPH LINK Cable for Windows (GLC-WIN, \$18)

This is a TI-GRAPH LINK cable for PC computers running Windows 95/98/2000, ME, or NT. The cable connects to a serial port on the computer. This product does not contain the TI-GRAPH LINK software or manuals. This cable will not work with older versions of Graphical Analysis.

TI-GRAPH LINK Package for USB (GLC-USB, \$54)

This is a TI-GRAPH LINK cable for USB-compatible computers. This cable connects directly to the USB port of Macintosh or Windows computers. It comes with a CD, which includes Macintosh TI-GRAPH LINK software and a user's manual.

TI InterActive!™

TI InterActive! is user-friendly, interactive computer software for teachers and students. This program enables high school and college teachers and students to easily investigate ideas in mathematics and science. Features include:

- Word processor with integrated math system
- TI graphing calculator functionality
- Symbolic Computer Algebra System
- Data editor with spreadsheet
- Calculator connectivity

TI InterActive! is sold in the following packages:

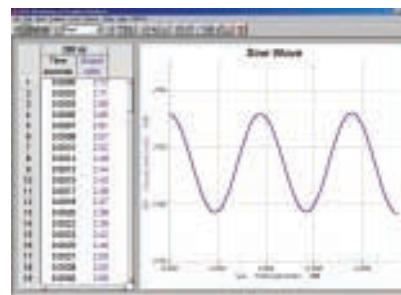
TI Interactive Teacher Edition Single License	TI-INT-TE	\$63.50
TI Interactive 10 User Site License	TI-INT-10	\$293.50
TI Interactive 30 User Site License	TI-INT-30	\$683.50
TI Interactive 50 User Site License	TI-INT-50	\$976.50
TI Interactive 100 User Site License	TI-INT-100	\$1563.50

Calculator Products Price List

Product	Order Code	Price
CBL 2 System	CBL2	\$166
Vernier LabPro	LABPRO	\$220
Calculator-Based Ranger	CBR	\$95
TI-83 Plus Calculator	TI-83PL	\$98
TI-83 Plus Silver Edition NEW!	TI-83PSE	\$129
TI-73 Calculator	TI-73	\$88
TI-86 Calculator	TI-86	\$109
TI-89 Calculator	TI-89	\$138
TI-92 Plus Calculator	TI-92PL	\$175
TI-92 Plus Module	TI-92MOD	\$75
TI-83 Plus Teacher Pack	TI-83PLTP	\$980
TI-73 Teacher Pack	TI-73TP	\$880
TI-83 Plus Silver Edition Teacher Pack NEW!	TI-83SETP	\$1290
TI-83 Plus Silver Edition ViewScreen NEW! (includes calculator)	TI-83SEVS	\$326
TI-73 ViewScreen (includes calculator)	TI-73VS	\$300
TI-86 ViewScreen (includes calculator)	TI-86VS	\$345
TI-89 ViewScreen (includes calculator)	TI-89VS	\$379
TI-92 ViewScreen (no calculator)	TI-92VS	\$239
TI Presenter (no calculator)	TI-PRE	\$297
TI-83 Plus Silver Edition ViewScreen Calculator	TI-83SEVSC	\$139
TI-73 ViewScreen Calculator	TI-73VSC	\$106
TI-86 ViewScreen Calculator	TI-86VSC	\$126
TI-89 ViewScreen Calculator	TI-89VSC	\$147
TI-GRAPH LINK Package	TI-GL	\$55
TI-GRAPH LINK for USB	GLC-USB	\$54
TI-GRAPH LINK for Macintosh	GLC-MAC	\$29
TI-GRAPH LINK for Windows	GLC-WIN	\$18
Calculator-to-Calculator Link Cable	TI-CLC	\$5
Short Calculator Link Cable	TI-SLC	\$5
Vernier AC Adapter (for LabPro, CBL 2, CBL)	IPS	\$10

Graphical Analysis 3.0

Graphical Analysis is a user-friendly, yet powerful, graphing and analysis program. An important feature of the program is the ability to easily move data from a TI Graphing Calculator to the program with any of the TI-GRAPH LINK cables listed on this page.



During this process, the data are automatically transferred to the data table and it appears on a graph. Once in the program, you can make use of the extensive analysis and graphing features of Graphical Analysis. See pp. 8-9 for more information.

Graphical Analysis 3.0 for Windows and Macintosh

Order Code **GA** **\$80**
(Includes site license for both Windows and Macintosh versions.)



CALCULATOR DATA COLLECTION

Sensors

Sensor	Order Code	Price
3-Axis Accelerometer	3D-BTA	\$199
25-g Accelerometer	ACC-BTA	\$91
Low-g Accelerometer	LGA-BTA	\$90
Barometer	BAR-BTA	\$58
CO ₂ Gas Sensor	CO2-BTA	\$261
Colorimeter	COL-BTA	\$99
Conductivity Probe	CON-BTA	\$89
Current Probe NEW!	DCP-BTA	\$37
Differential Voltage Probe NEW!	DVP-BTA	\$35
Digital Control Unit*	DCU-BTD	\$61
Dissolved Oxygen Probe	DO-BTA	\$191
Dual-Range Force Sensor	DFS-BTA	\$99
EKG Sensor	EKG-BTA	\$142
Exercise Heart Rate Monitor	EHR-BTA	\$91
Extra-Long Temperature Probe	TPL-BTA	\$70
Flow Rate Sensor	FLO-BTA	\$129
Gas Pressure Sensor	GPS-BTA	\$71
Instrumentation Amplifier	INA-BTA	\$51
Ammonium Ion-Selective Electrode	NH4-BTA	\$165
Calcium Ion-Selective Electrode	CA-BTA	\$165
Chloride Ion-Selective Electrode	CL-BTA	\$165
Nitrate Ion-Selective Electrode	NO3-BTA	\$165
Light Sensor	LS-BTA	\$45
Magnetic Field Sensor	MG-BTA	\$54
Microphone	MCA-BTA	\$35
Motion Detector	MD-BTD	\$64
O ₂ Gas Sensor	O2-BTA	\$186
pH Sensor	PH-BTA	\$74
Radiation Monitor*	RM-BTD	\$205
Relative Humidity Sensor	RH-BTA	\$67
Respiration Monitor Belt (requires GPS-BTA)	RMB	\$58
Sound Level Meter NEW!	SLM-BTA	\$209
Stainless Steel Temperature Probe	TMP-BTA	\$29
Student Radiation Monitor*	SRM-BTD	\$145
Turbidity Sensor	TRB-BTA	\$99
Thermocouple	TCA-BTA	\$37
Vernier Photogate*	VPG-BTD	\$43
Voltage Probe	VP-BTA	\$9

* If you are using a Photogate, Radiation Monitor, or Digital Control Unit with the original CBL, you need a different model. See the sensor section (pp. 42-52) for details.

Do I Need an Adapter?

If you are purchasing the sensors listed above, you do not need to purchase adapters for LabPro or CBL 2. Our sensors have "BT" (British Telecom) connectors and plug directly into these interfaces.

Almost all older Vernier sensors will work with LabPro, CBL 2, and CBL, but they may need an adapter. Most of our analog sensors were previously manufactured with a round, 5-pin "DIN" plug. If you have one of these older DIN sensors, you will need a DIN-to-BTA adapter (order code DIN-BTA, \$5) for use with LabPro, CBL 2, and CBL. (The DIN-to-BTA adapter is also known as the CBL-DIN adapter.) Our older-style photogates, Motion Detectors, and radiation monitors will require digital adapters for use with these interfaces. A chart of adapters can be found on page 53.



DIN-to-BTA adapter

Lab Books for CBL 2 and LabPro

Our lab books include a CD with complete student experiments and materials list, step-by-step instructions, data tables, and questions. Instructions for using TI Graphing Calculators with LabPro or the CBL 2 are also included. See pp. 30-31 for more information. (See bottom of page 31 for lab books written for the original CBL.)

<i>Real-World Math with CBL 2 and LabPro</i> NEW!	RWCALC	\$25
<i>Physics with Calculators</i>	PWCALC	\$45
<i>Chemistry with Calculators</i>	CWCALC	\$45
<i>Biology with Calculators</i>	BWCALC	\$45
<i>Water Quality with Calculators</i>	WQCALC	\$45
<i>Physical Science with Calculators</i>	PSCALC	\$45
<i>Middle School Science with Calculators</i>	MSCALC	\$45
<i>Nuclear Radiation with Computers and Calculators</i>	NRCC	\$25

NEW! *Real-World Math with CBL 2™ and LabPro®*
by John E. Gastineau, Chris Brueningsen, Bill Bower, Linda Antinone and Elisa Kerner

This new book contains 29 activities that explore real-world applications of math concepts using either the CBL 2 or LabPro. Concepts from algebra through calculus are covered. Activities cover a wide variety of topics, including linear, quadratic, and periodic functions, statistics, systems of equations, and many more. The printed text supports the TI-73, TI-83, and TI-83 Plus calculators. The CD provided with the book contains the word processing files for the TI-86, TI-89, TI-92, and TI-92 Plus calculators. (Order Code RWCALC, \$25)

TI CBL Publications

NEW! *Activities for the Middle Grades with the CBL 2 and the TI-73*

by Debbie Crawford, Ray Leonard, and Cathy Roberts

This new book from Texas Instruments contains 22 middle school science investigations that provide hands-on data collection with a variety of sensors. Physical science, life science, and earth and space science activities are included. Even though *Activities for Middle Grades Science with the CBL 2 and the TI-73* was written for the CBL 2, you can also use it with the Vernier LabPro interface. (Order Code TI-MGS, \$20)



College Physics with the CBL™ and TI-86

by John E. Gastineau

College Physics with the CBL and TI-86 contains 30 activities in mechanics, sound, light, electricity, and magnetism. This book can be used in introductory physics college or advanced high school physics courses. (Order Code TI-CP, \$20)



PACKAGES FOR CBL 2



CBL 2 Math Packages

Purchase one package per calculator.

Feel free to build your own package!



Interface and Sensors	Order Code	Starter Package MT-C2-STR	Deluxe Package MT-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ Microphone	MCA-BTA		\$35
⑤ Gas Pressure Sensor	GPS-BTA		\$71
⑥ pH Sensor	PH-BTA		\$74
Package Price		\$329	\$499

Support Materials	Order Code	Price
Real-World Math with CBL 2 and LabPro lab book	RWCALC	\$25
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80

For LabPro calculator packages, see pp. 12-29.

CBL 2 Biology Packages

Purchase one package per calculator.

Feel free to build your own package!



Interface and Sensors	Order Code	Starter Package BIO-C2-STR	Deluxe Package BIO-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Exercise Heart Rate Monitor	EHR-BTA	\$91	\$91
③ Gas Pressure Sensor	GPS-BTA	\$71	\$71
④ O ₂ Gas Sensor	O2-BTA	\$186	\$186
⑤ Conductivity Probe	CON-BTA		\$89
⑥ Colorimeter	COL-BTA		\$99
⑦ Dissolved Oxygen Probe	DO-BTA		\$191
⑧ pH Sensor	PH-BTA		\$74
⑨ EKG Sensor	EKG-BTA		\$142
⑩ Respiration Monitor Belt	RMB		\$58
⑪ CO ₂ Gas Sensor	CO2-BTA		\$261
⑫ CO ₂ -O ₂ Tee	CO2-TEE		\$5
Package Price		\$514	\$1399

Support Materials	Order Code	Price
Biology with Calculators lab book	BWCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80



PACKAGES FOR CBL 2



For LabPro calculator packages, see pp. 12-29.

CBL 2 Physics Packages

Purchase one package per calculator.

Feel free to build your own package!

Interface and Sensors	Order Code	Starter Package PHY-C2-STR	Deluxe Package PHY-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ Microphone	MCA-BTA	\$35	\$35
⑤ Low-g Accelerometer	LGA-BTA		\$90
⑥ Vernier Photogate	VPG-BTD		\$43
⑦ Super Pulley Attachment	SPA		\$20
⑧ Magnetic Field Sensor	MG-BTA		\$54
⑨ Differential Voltage Probe	DVP-BTA		\$35
⑩ (2) Current Probes	DCP-BTA		2@\$37=\$74
⑪ Picket Fence	PF		\$5
Package Price		\$364	\$672

Support Materials	Order Code	Price
<i>Physics with Calculators</i> lab book	PWCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80

CBL 2 Physical Science Packages

Purchase one package per calculator.

Feel free to build your own package!



Interface and Sensors	Order Code	Starter Package PS-C2-STR	Deluxe Package PS-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Motion Detector	MD-BTD	\$64	\$64
③ Dual-Range Force Sensor	DFS-BTA	\$99	\$99
④ pH Sensor	PH-BTA	\$74	\$74
⑤ Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
⑥ Conductivity Probe	CON-BTA		\$89
⑦ Gas Pressure Sensor	GPS-BTA		\$71
⑧ Magnetic Field Sensor	MG-BTA		\$54
Package Price		\$432	\$633

Support Materials	Order Code	Price
<i>Physical Science with Calculators</i> lab book	PSCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80

PACKAGES FOR CBL 2



CBL 2 Middle School Science Packages

Purchase one package per calculator.

Feel free to build your own package!



Interface and Sensors	Order Code	Starter Package MS-C2-STR	Deluxe Package MS-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Motion Detector	MD-BTD	\$64	\$64
③ pH Sensor	PH-BTA	\$74	\$74
④ Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
⑤ Exercise Heart Rate Monitor	EHR-BTA		\$91
⑥ Dual-Range Force Sensor	DFS-BTA		\$99
⑦ Conductivity Probe	CON-BTA		\$89
⑧ Gas Pressure Sensor	GPS-BTA		\$71
⑨ Magnetic Field Sensor	MG-BTA		\$54
Package Price		\$333	\$722

Support Materials	Order Code	Price
Middle School Science with Calculators lab book	MSCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80

For LabPro calculator packages, see pp. 12-29.

CBL 2 Water Quality Packages

Purchase one package per calculator.

Feel free to build your own package!



Interface and Sensors	Order Code	Starter Package WQ-C2-STR	Deluxe Package WQ-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② pH Sensor	PH-BTA	\$74	\$74
③ Dissolved Oxygen Probe	DO-BTA	\$191	\$191
④ Conductivity Probe	CON-BTA	\$89	\$89
⑤ Turbidity Sensor	TRB-BTA	\$99	\$99
⑥ Colorimeter	COL-BTA		\$99
⑦ Flow Rate Sensor	FLO-BTA		\$129
⑧ Ammonium Ion-Selective Electrode	NH4-BTA		\$165
⑨ Calcium Ion-Selective Electrode	CA-BTA		\$165
⑩ Chloride Ion-Selective Electrode	CL-BTA		\$165
⑪ Nitrate Ion-Selective Electrode	NO3-BTA		\$165
Package Price		\$619	\$1477

Support Materials	Order Code	Price
Water Quality with Calculators lab book	WQCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80



PACKAGES FOR CBL 2



CBL 2 Chemistry Packages

Purchase one package per calculator.

Feel free to build your own package!

Interface and Sensors	Order Code	Starter Package CH-C2-STR	Deluxe Package CH-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
③ pH Sensor	PH-BTA	\$74	\$74
④ Gas Pressure Sensor	GPS-BTA	\$71	\$71
⑤ Conductivity Probe	CON-BTA		\$89
⑥ Colorimeter	COL-BTA		\$99
Package Price		\$340	\$518

Support Materials	Order Code	Price
Chemistry with Calculators lab book	CWCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80

For LabPro calculator packages, see pp. 12-29.



CBL 2 Earth Science Packages

Purchase one package per calculator.

Feel free to build your own package!

Interface and Sensors	Order Code	Starter Package ES-C2-STR	Deluxe Package ES-C2-DX
① CBL 2	CBL2	\$166	\$166
① Voltage, Light, and Stainless Steel Temperature Probes included with CBL 2		\$0	\$0
② Stainless Steel Temperature Probe	TMP-BTA	\$29	\$29
③ pH Sensor	PH-BTA	\$74	\$74
④ Magnetic Field Sensor	MG-BTA		\$54
⑤ Conductivity Probe	CON-BTA		\$89
Package Price		\$269	\$404

Support Materials	Order Code	Price
Middle School Science with Calculators lab book	MSCALC	\$45
TI-GRAPH LINK (See page 35 for details.)		
Graphical Analysis 3.0 (See pp. 8-9 for details.)	GA	\$80



Serial Box Interface and Universal Lab Interface

Even though we have our LabPro interface, our older interfaces (Serial Box Interface and Universal Lab Interface) are still available!

Why buy one of our older interfaces?

- If you already own these interfaces, you may want to add one more to your classroom.
- If you have older Macintosh computers (pre-Power Macintosh) or older MS-DOS computers, the Serial Box or the Universal Lab Interface is a great way to go!
- The Serial Box Interface, priced at \$99, is still the least expensive way to get started with computer data collection.



Measuring the effects of insulation on heat retention.

Serial Box Interface

Use the Serial Box Interface for temperature, pH, pressure, and colorimeter measurements with an older computer. It is a great, low cost solution for chemistry, biology, or other classes which do not require extremely fast data collection.

Data Logger Software

Data Logger software makes data collection, graphing, and analysis easy. Dozens of experiment files are on the disk, including files to match all the labs in our *Chemistry with Computers* (CWC-DL) and *Biology with Computers* (BWC-DL) books. Data Logger will run on nearly all pre-Power Macintosh computers or with 386 and 486 IBM compatible PCs.

Data Logger (includes site license)

Data Logger for MS-DOS DL-DOS \$30
Data Logger for Macintosh DL-MAC \$30

Serial Box Interface

Includes the interface, Voltage Probe, power supply, cable to PC or Macintosh, and user's manual. See page 42 for a list of the 29 sensors that can be used with the Serial Box. (A Rechargeable Battery Pack for remote data collection is sold separately. Contact us for details.)

For PC SBI-IBM \$99
 For Macintosh SBI-MAC \$99

Universal Lab Interface (ULI)

Use the Universal Lab Interface to study motion, force, sound, pH, temperature, EKG, radiation, light, and more with an older computer. The ULI is a lab interface for all areas of science. Connect the ULI to the serial port of your computer, plug in the



appropriate sensors, and launch our data collection software. Click on the Collect button, and data is collected as a real-time graph. You can then examine or print the graph, scroll through the data table, export data to other programs or use the data analysis features of the software.

Experiment files make using the ULI easy. Simply open the appropriate experiment file and you are ready to collect data! Details of the experiment, such as calibration, data rate, averaging, length of experiment, and time units are stored in the experiment file. For example, if you want to do a sound experiment with an FFT, open the appropriate file. Over 150 experiment files are available, including files covering all the labs in our series of books.

The ULI Software Package will run on nearly all pre-Power Macintosh computers or with 386 and 486 IBM-compatible PCs. See our web site for more details about the software.

ULI Data Collection Software Package

Includes programs for use with motion detectors, photogates, or any of our analog sensors for studying force, sound, acceleration, temperature, pressure, EKG, light, magnetic field, etc.

ULI Data Collection Software Package (includes site license)

for MS-DOS USP-DOS \$49
for Macintosh USP-MAC \$49

Universal Lab Interface (ULI)

Includes the interface, Voltage Probe, power supply, cable to IBM or Macintosh, and User's Manual. See page 42 for a list of the 36 sensors you can use with the ULI.

For PC ULI-IBM \$199
 For Macintosh ULI-MAC \$199

Our ULI or Serial Box Interface can also be used on newer computers with our Logger Pro software. See page 7 for details.



Compatibility/Price Chart

Sensor	LabPro or CBL 2		Original CBL		SBI or ULI	
	Order Code	Price	Order Code	Price	Order Code	Price
3-Axis Accelerometer	3D-BTA	\$199	3D-BTA	\$199	3D-DIN <i>(ULI only)</i>	\$199
25-g Accelerometer	ACC-BTA	\$91	ACC-BTA	\$89	ACC-DIN <i>(ULI only)</i>	\$89
Low-g Accelerometer	LGA-BTA	\$90	LGA-BTA	\$90	LGA-DIN	\$88
Barometer	BAR-BTA	\$58	BAR-BTA	\$58	BAR-DIN	\$56
CO ₂ Gas Sensor	CO2-BTA	\$261	CO2-BTA	\$261	CO2-DIN	\$259
Colorimeter	COL-BTA	\$99	COL-BTA	\$99	COL-DIN	\$99
Conductivity Probe	CON-BTA	\$89	CON-BTA	\$89	CON-DIN	\$79
Current & Voltage Probe System	(use DVP- & DCP-BTA)		(use DVP- & DCP-BTA)		CV-DIN	\$84
Current Probe NEW!	DCP-BTA	\$37	DCP-BTA	\$37	(use CV-DIN)	
Differential Voltage Probe NEW!	DVP-BTA	\$35	DVP-BTA	\$35	(use CV-DIN)	
Digital Control Unit	DCU-BTD	\$61	DCU-CBL	\$59		
Direct-Connect Temperature Probe	(use TMP-BTA)		(use TMP-BTA)		DCT-DIN	\$28
Dissolved Oxygen Probe	DO-BTA	\$191	DO-BTA	\$191	DO-DIN	\$189
Dual-Range Force Sensor	DFS-BTA	\$99	DFS-BTA	\$99	DFS-DIN	\$98
EKG Sensor	EKG-BTA	\$142	EKG-BTA	\$142	EKG-DIN	\$140
Exercise Heart Rate Monitor	EHR-BTA	\$91	EHR-BTA	\$91	EHR-DIN	\$89
Extra-Long Temperature Probe	TPL-BTA	\$70	TPL-BTA	\$70	TPL-DIN	\$68
Flow Rate Sensor	FLO-BTA	\$129	FLO-BTA	\$129	FLO-DIN	\$128
Gas Pressure Sensor	GPS-BTA	\$71	GPS-BTA	\$71	GPS-DIN	\$70
Instrumentation Amplifier	INA-BTA	\$51	INA-BTA	\$51	INA-DIN	\$49
Ammonium Ion-Selective Electrode	NH4-BTA	\$165	NH4-BTA	\$165	NH4-DIN	\$163
Calcium Ion-Selective Electrode	CA-BTA	\$165	CA-BTA	\$165	CA-DIN	\$163
Chloride Ion-Selective Electrode	CL-BTA	\$165	CL-BTA	\$165	CL-DIN	\$163
Nitrate Ion-Selective Electrode	NO3-BTA	\$165	NO3-BTA	\$165	NO3-DIN	\$163
Light Sensor	LS-BTA	\$45	LS-BTA	\$45	LS-DIN	\$39
Magnetic Field Sensor	MG-BTA	\$54	MG-BTA	\$54	MG-DIN	\$44
Microphone	MCA-BTA	\$35	MCA-BTA	\$35	MCA-ULI <i>(ULI only)</i>	\$30
Motion Detector	MD-BTD	\$64	MD-BTD	\$64	MD-ULI <i>(ULI only)</i>	\$65
O ₂ Gas Sensor	O2-BTA	\$186	O2-BTA	\$186	O2-DIN	\$184
pH Sensor	PH-BTA	\$74	PH-BTA	\$74	PH-DIN	\$72
Radiation Monitor	RM-BTD	\$205	RM-DG*	\$199	RM-DG <i>(ULI only)</i>	\$199
Relative Humidity Sensor	RH-BTA	\$67	RH-BTA	\$67	RH-DIN	\$65
Respiration Monitor Belt <i>(requires GPS-BTA)</i>	RMB	\$58	RMB	\$58	RMB	\$58
Rotary Motion Sensor	RMS-BTD	\$195			RMS-ULI <i>(ULI only)</i>	\$193
Sound Level Meter NEW!	SLM-BTA	\$209	SLM-BTA	\$209	SLM-DIN	\$207
Stainless Steel Temperature Probe	TMP-BTA	\$29	TMP-BTA	\$29	(use DCT-DIN)	
Student Radiation Monitor	SRM-BTD	\$145	SRM-DG*	\$138	SRM-DG <i>(ULI only)</i>	\$138
Turbidity Sensor	TRB-BTA	\$99	TRB-BTA	\$99	TRB-DIN	\$105
Thermocouple	TCA-BTA	\$37	TCA-BTA	\$37	TCA-DIN	\$35
Vernier Photogate	VPG-BTD	\$43	VPG-DG*	\$40	VPG-DG <i>(ULI only)</i>	\$40
Voltage Probe	VP-BTA	\$9	VP-BTA	\$9	VP-DIN	\$7

* Requires CBL-P adapter.

NOTE: You can download our sensor manuals from our web site.



Accelerometers



We have three accelerometers for different uses. These small devices can be mounted on moving objects.

Low-g Accelerometer

This is the best choice for most experiments. Use it for studying the one-dimensional motion of a car (real and toy), elevator, pendulum bob, or amusement park ride.

Range: -50 to +50 m/s²
Typical accuracy: ±0.1 m/s²

Order Code LGA-BTA (for LabPro, CBL, CBL 2) \$90
Order Code LGA-DIN (for ULI, Serial Box) \$88

25-g Accelerometer

This is great for studying one-dimensional collisions or any motion with larger accelerations.

Range: -250 to +250 m/s²
Typical accuracy: ±1 m/s²

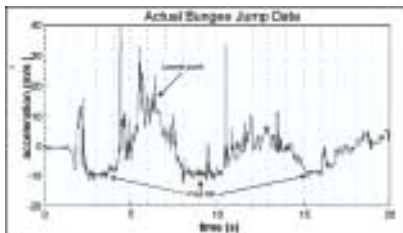
Order Code ACC-BTA (for LabPro, CBL, CBL 2) \$91
Order Code ACC-DIN (for ULI) \$89

3-Axis Accelerometer

This is really three low-g accelerometers mounted at right angles and all placed in a small box. Use it for studying the complex motion of an amusement park ride, a bungee jumper, or simply a toss in the air.

Order Code 3D-BTA (for LabPro, CBL, CBL 2) \$199
Order Code 3D-DIN (for ULI) \$199

Range: -50 to +50 m/s²
Typical accuracy: ±0.1 m/s²



Bungee jump data taken with a Low-g Accelerometer.

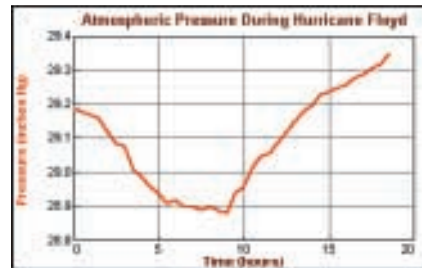
Barometer



Our Barometer can be used for weather studies or for lab experiments involving pressures close to normal air pressure.

Range: 25.0 to 31.5 in. of Hg
(0.80 to 1.05 atm)
(81 to 106 kPa)
(608 to 798 mmHg)
12-bit Resolution (LabPro): 0.003 in. Hg
10-bit Resolution (CBL, CBL 2): 0.01 in. Hg

Order Code BAR-BTA (for LabPro, CBL, CBL 2) \$58
Order Code BAR-DIN (for ULI, Serial Box) \$56



Judy Powell Day (North Carolina State University) used our Barometer during Hurricane Floyd.

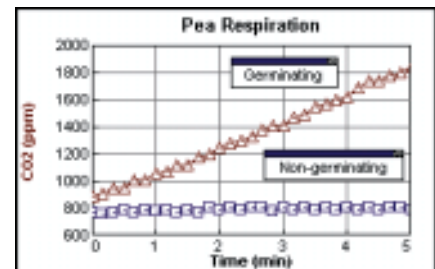
CO₂ Gas Sensor



The CO₂ Gas Sensor measures gaseous carbon dioxide levels in the range of 0 to 5000 ppm. This sensor is great for measuring changes in CO₂ levels during plant photosynthesis and respiration. You can easily monitor changes in CO₂ levels occurring in respiration of organisms as small as crickets or beans! The CO₂ Gas Sensor is easily calibrated using a calibration button. A chamber (shown below) is included for running controlled experiments with small plants and animals.

Typical Resolution: 20 ppm
Range: 0-5000 ppm

Order Code CO2-BTA (for LabPro, CBL, CBL 2) ... \$261
Order Code CO2-DIN (for ULI, Serial Box) \$259



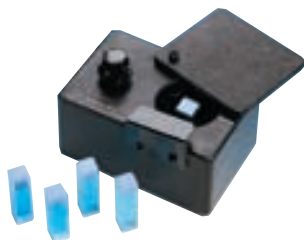
Measuring CO₂ levels of germinating and non-germinating peas.





SENSORS

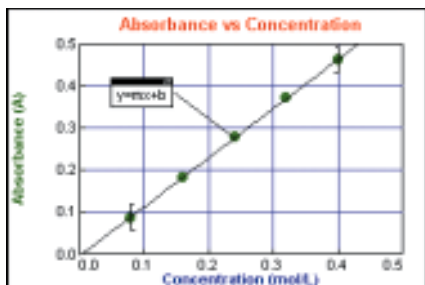
Colorimeter



This is a 3-wavelength Colorimeter. It is great for Beer's law experiments, determining the concentration of unknown solutions, or studying changes in concentration vs. time. Fifteen 3.5-mL cuvettes are included. A package of 100 replacement cuvettes (with 20 lids) is available (order code CUV, \$10).

Wavelengths: 470 nm
565 nm
635 nm
12-bit Resolution (LabPro): 0.04 %T
10-bit Resolution (CBL, CBL 2): 0.16 %T

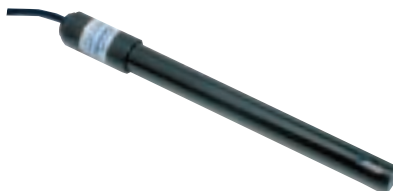
Order Code COL-BTA (for LabPro, CBL, CBL 2) \$99
Order Code COL-DIN (for ULI, Serial Box) \$99



Beer's law graph.



Conductivity Probe



This probe is great for environmental testing for salinity, total dissolved solids (TDS), or conductivity in water samples. Biology teachers can use this probe to demonstrate diffusion of ions through membranes or to monitor changes in ion levels in aquatic systems. Chemistry students can use it to investigate the difference between ionic and molecular compounds, strong and weak acids, or ionic compounds that yield different ratios of ions. The Conductivity Probe can monitor concentration or conductivity at three different sensitivity settings.

Automatic Temperature Compensation: 5°C-35°C

Low Range:

Range: 0-200 μ S (0-100 mg/L TDS)
12-bit Resolution (LabPro): 0.1 μ S
10-bit Resolution (CBL, CBL 2): 0.4 μ S

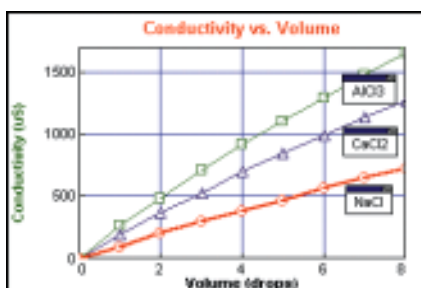
Medium Range:

Range: 0-2000 μ S (0-1000 mg/L TDS)
12-bit Resolution (LabPro): 1 μ S
10-bit Resolution (CBL, CBL 2): 4 μ S

High Range:

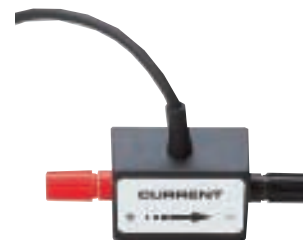
Range: 0-20000 μ S (0-10000 mg/L TDS)
12-bit Resolution (LabPro): 10 μ S
10-bit Resolution (CBL, CBL 2): 40 μ S

Order Code CON-BTA (for LabPro, CBL, CBL 2) \$89
Order Code CON-DIN (for ULI, Serial Box) \$79



Conductivity of three different salts.

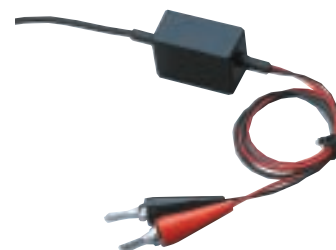
Current Probe **NEW!**



Use the Current Probe to measure currents in low-voltage AC and DC circuits. With a range of ± 0.6 A, this system is ideal for use in most "battery and bulb" circuits. Use it with the Differential Voltage Probe to explore Ohm's law, phase relationships in reactive components, and much more. Use multiple sensors to explore series and parallel circuits. It can also be used in electrochemistry experiments.

Order Code DCP-BTA (for LabPro, CBL, CBL 2) \$37

Range: ± 0.6 A
Sense Resistor: 0.1 Ω



Differential Voltage Probe **NEW!**

Use the Differential Voltage Probe to measure currents in low-voltage AC and DC circuits. With a range of ± 6.0 V, this system is ideal for use in most "battery and bulb" circuits. Use it with the Differential Current Probe to explore Ohm's law, phase relationships in reactive components, and much more. This differs from the Voltage Probe that comes with your interface in that neither clip is connected to ground. Use multiple sensors to explore series and parallel circuits.

Order Code DVP-BTA (for LabPro, CBL, CBL 2) \$35

Range: ± 6.0 V
Input Impedance: 10 M



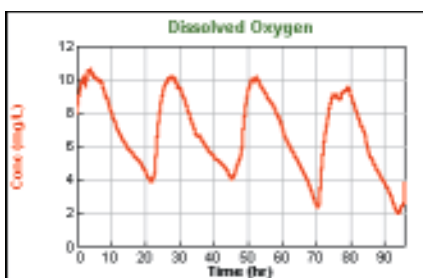
Dissolved Oxygen Probe



Use the Dissolved Oxygen Probe to determine the concentration of oxygen in aqueous solutions. It has built-in temperature compensation and a fast response time. This probe is great for biology, chemistry, ecology, or integrated science courses. Included with the probe is a zero-oxygen solution, two caps prefitted with membranes, a 100% calibration bottle, and electrode filling solution. Replacement membrane caps are available (order code MEM, \$11).

Automatic Temperature Compensation: 5°C-35°C
 Range: 0 to 14 mg/L
 12-bit Resolution (LabPro): 0.007 mg/L
 10-bit Resolution (CBL, CBL 2): 0.028 mg/L
 Single Piece Membrane Cap

Order Code DO-BTA (for LabPro, CBL, CBL 2) **\$191**
Order Code DO-DIN (for ULI, Serial Box) **\$189**



Fluctuation of dissolved oxygen concentration in *Elodea* photosynthesis.

Dual-Range Force Sensor



Our force sensor can be easily mounted on a ring stand or dynamics cart, or used as a replacement for a hand-held spring scale. Use it to study friction, simple harmonic motion, impact in collisions, or centripetal force.

10N:
 Range: -10 to +10 N
 12-bit Resolution (LabPro): 0.006 N
 10-bit Resolution (CBL, CBL 2): 0.024 N

50N:
 Range: -50 to +50 N
 12-bit Resolution (LabPro): 0.03 N
 10-bit Resolution (CBL, CBL 2): 0.12 N

Order Code DFS-BTA (for LabPro, CBL, CBL 2) **\$99**
Order Code DFS-DIN (for ULI, Serial Box) **\$98**

We also have three adapters for use with the Dual-Range Force Sensor:

Dynamics Track Adapter

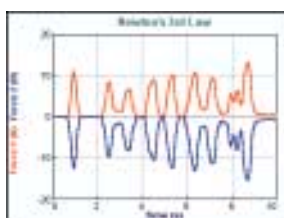
This adapter is specifically designed to attach to a PASCO Dynamics Track. Multiple mounting options allow for sensor-to-sensor or sensor-to-cart collision measurements. Includes two magnetic bumper attachments.
Order Code DTA-DFS **\$46**

Air Track Adapter

Allows the Dual-Range Force Sensor to be mounted on the end of an air track for collision studies. Compatible with most air tracks. Includes two magnetic bumpers.
Order Code ATA-DFS **\$43**

Force Table Adapter

Use your Dual-Range Force Sensor with your force table for resolution of vectors experiments. Includes mounting clamp.
Order Code FTA-DFS **\$25**



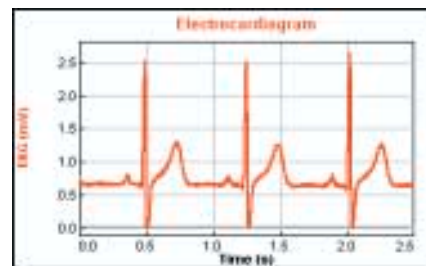
Newton's third law using two Dual-Range Force Sensors.

EKG Sensor



The EKG Sensor measures electrical signals produced by the heart. It uses three disposable electrodes. An EKG graph is displayed, demonstrating to students the contraction and repolarization of the heart's chambers. A package of 100 disposable electrodes is included with the sensor. A package of 100 additional electrodes is available (order code ELEC, \$10).

Order Code EKG-BTA (for LabPro, CBL, CBL 2) ... **\$142**
Order Code EKG-DIN (for ULI, Serial Box) **\$140**



Electrocardiogram using the EKG Sensor.



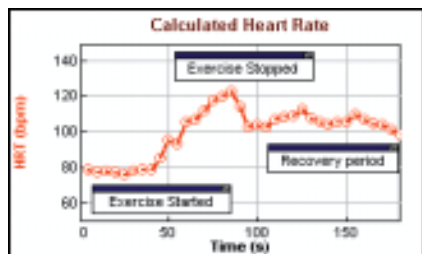
SENSORS

Exercise Heart Rate Monitor



The Exercise Heart Rate Monitor is ideal for determining the heart rate of actively moving individuals. With this sensor, a person's heart rate can be monitored during, as well as after exercise. The Exercise Heart Rate Monitor consists of a wireless transmitter belt and a receiver module that plugs into a Vernier interface or CBL. The transmitter belt senses the electrical signals generated by the heart, much like an EKG. For each heart beat detected, a signal is transmitted to the receiver module, and a heart rate is determined.

Order Code EHR-BTA (for LabPro, CBL, CBL 2) **\$91**
Order Code EHR-DIN (for ULI, Serial Box) **\$89**



Heart rate before, during, and after exercise.

Flow Rate Sensor



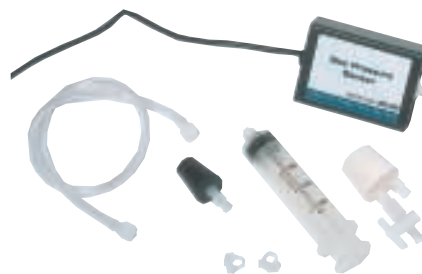
The Flow Rate Sensor allows you to easily measure stream velocity for environmental or earth science studies. Using this durable sensor, your students can measure the flow of a stream at different points in m/s or ft/s. Using flow rate data, your students will be able to calculate discharge value for the stream in m³/s or ft³/s, or determine the sediment transport of the stream. The impeller rod separates into four sections for easy transport and convenient storage. The Flow Rate Sensor comes equipped with a five-meter cable so your data collection equipment can stay on shore while you measure flow rate in the stream. Three riser rods are included with each sensor, which enable the impeller to be placed at fixed depths.

Range: 0 to 3.5 m/s
 12-bit Resolution (LabPro): 0.0012 m/s
 10-bit Resolution (CBL, CBL 2): 0.005 m/s

Order Code FLO-BTA (for LabPro, CBL, CBL 2) ... **\$129**
Order Code FLO-DIN (for ULI, Serial Box) **\$128**



Gas Pressure Sensor



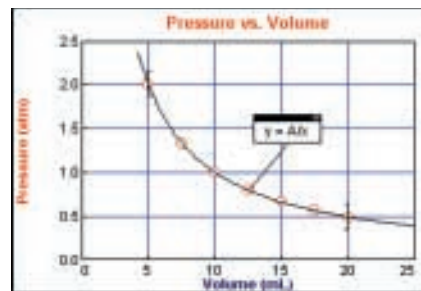
The Gas Pressure Sensor has enough resolution and range to work for all subject areas. Chemistry teachers will find that it has enough range for Boyle's law experiments (0 to 2.1 atm), yet provides greatly improved resolution for vapor pressure or pressure-temperature experiments (0.40 mm Hg with LabPro). For biology teachers, the package includes airtight tubing clamps for transpiration experiments, as well as special fittings for respiration experiments in small containers.

These gas-pressure accessories are included with each Gas Pressure Sensor:

- plastic tubing with 2 Luer-lock connectors
- 2-hole rubber stopper with two Luer-lock adapters
- 2-way valve
- 1-hole rubber stopper with one adapter

Range: 0 to 210 kPa
 (0 to 2.1 atm or 0 to 1600 mmHg)
 12-bit Resolution (LabPro): 0.05 kPa
 (0.0005 atm or 0.40 mmHg)
 10-bit Resolution (CBL or CBL 2): 0.2 kPa
 (0.002 atm or 1.6 mmHg)

Order Code GPS-BTA (for LabPro, CBL, CBL 2) **\$71**
Order Code GPS-DIN (for ULI, Serial Box) **\$70**



Boyle's law experiment.



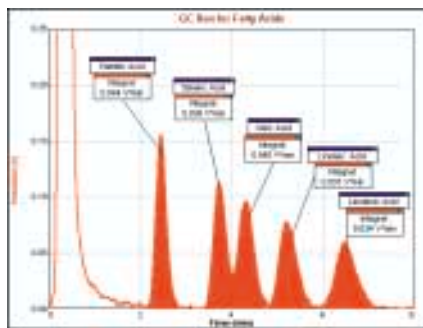
Instrumentation Amplifier



The Instrumentation Amplifier monitors voltages from a few millivolts (DC or AC). It has several switch settings to allow you to select the best gain. It can be used with any of our computer lab interfaces, as well as with the CBL or CBL 2. Typical uses would include amplifying the chart recorder output of any instrument (such as a Gas Chromatograph) so that its signal can be used with our lab interface or building a current sensor by measuring the voltage drop across a resistor.

Range Settings: 0-20 mV, 0-200 mV, 0-1 V, ±20 mV, ±200 mV, ±1 V

Order Code INA-BTA (for LabPro, CBL, CBL 2) \$51
Order Code INA-DIN (for ULI, Serial Box) \$49



Gas Chromatograph data analyzed using an Instrumentation Amplifier.

Ion-Selective Electrodes



Our Ion-Selective Electrodes are great for monitoring four environmentally important ions: Nitrate (NO_3^-), Chloride (Cl^-), Calcium (Ca^{2+}), and Ammonium (NH_4^+). Here are some of their features:

- Electrodes are combination-style, non-refillable, and gel-filled.
- It is important for you to know that Vernier ISE membranes, like all other PVC ISE membranes, have a limited life expectancy; however, the replaceable module of Vernier ISEs allows you to simply discard the used membrane module, and replace it with a new one. To purchase Replacement Modules, see the Accessories List on page 54. We recommend that you do not purchase replacement modules far in advance of their expected time of use, as their life expectancy is limited as well.
- Included with each ISE are two calibration standards and a Short-Term Soaking Bottle. To purchase additional standards, see page 54 for more information.

Electrode	Order Code	Price
Nitrate	NO3-BTA (for LabPro, CBL, CBL 2) ..	\$165
	NO3-DIN (for ULI, Serial Box)	\$163
Chloride	CL-BTA (for LabPro, CBL, CBL 2)	\$165
	CL-DIN (for ULI, Serial Box)	\$163
Calcium	CA-BTA (for LabPro, CBL, CBL 2)	\$165
	CA-DIN (for ULI, Serial Box)	\$163
Ammonium ..	NH4-BTA (for LabPro, CBL, CBL 2) ..	\$165
	NH4-DIN (for ULI, Serial Box)	\$163

Ammonium ISE:

Range: 0.1 to 18,000 mg/L or ppm
 12-bit Resolution (LabPro): 0.7% of reading
 10-bit Resolution (CBL, CBL 2): 2.8% of reading

Calcium ISE:

Range: 0.2 to 40,000 mg/L or ppm
 12-bit Resolution (LabPro): 1.4% of reading
 10-bit Resolution (CBL, CBL 2): 5.6% of reading

Chloride ISE:

Range: 1.8 to 35,000 mg/L or ppm
 12-bit Resolution (LabPro): 0.7% of reading
 10-bit Resolution (CBL, CBL 2): 2.8% of reading

Nitrate ISE:

Range: 0.1 to 14,000 mg/L or ppm
 12-bit Resolution (LabPro): 0.7% of reading
 10-bit Resolution (CBL, CBL 2): 2.8% of reading

Light Sensor



Our Light Sensor approximates the human eye in spectral response and can be used over three different illumination ranges, which you select with a switch. Use it for inverse square law experiments or for studying polarizers, reflectivity, or solar energy.

Low:

Range: 0 to 600 lux

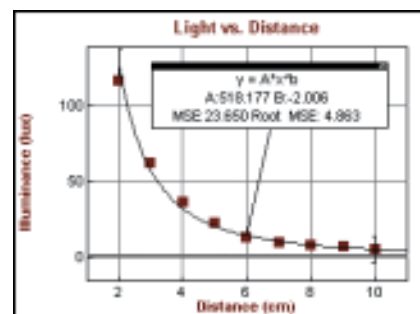
Medium:

Range: 0 to 6000 lux

High:

Range: 0 to 150,000 lux

Order Code LS-BTA (for LabPro, CBL, CBL 2) \$45
Order Code LS-DIN (for ULI, Serial Box) \$39



Inverse square relationship.



SENSORS

Magnetic Field Sensor



This sensor, which uses a Hall effect transducer, is sensitive enough to measure the earth's magnetic field. It can also be used to study the field around permanent magnets, coils, and electrical devices.

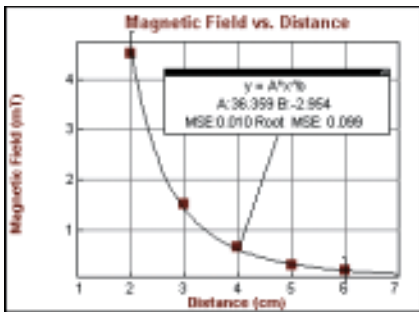
Low Sensitivity:

Range: -6.4 mT to +6.4 millitesla (mT)

High Sensitivity:

Range: -0.32 mT to +0.32 mT

Order Code MG-BTA (for LabPro, CBL, CBL 2) \$54
Order Code MG-DIN (for ULI, Serial Box) \$44



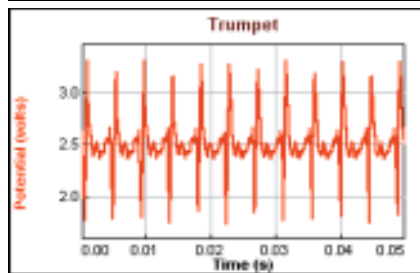
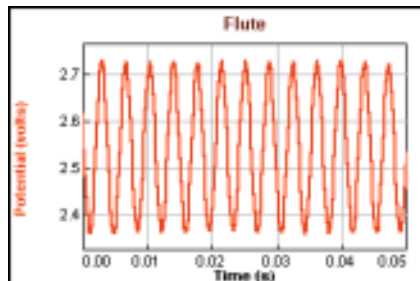
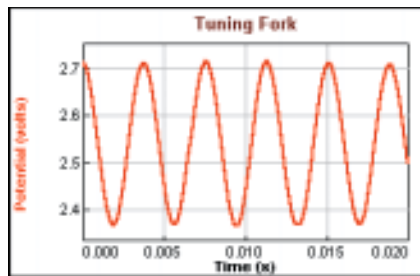
Inverse cube relationship.

Microphone



Our Microphone can be used to display and study the waveforms of sounds from voices and musical instruments. It is also great for speed of sound experiments.

Order Code MCA-BTA (for LabPro, CBL, CBL 2) ... \$35
Order Code MCA-ULI (for ULI) \$30



Sound waves of various instruments using a Microphone.

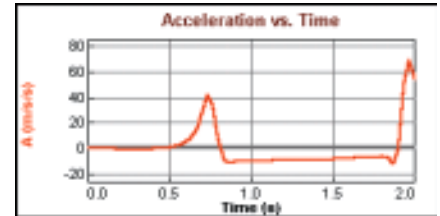
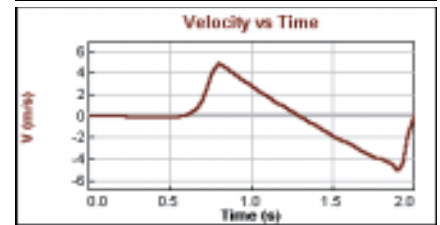
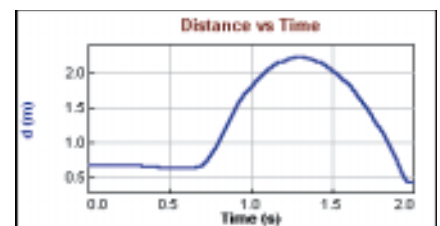
Motion Detector



The Motion Detector functions like the automatic range finder on a Polaroid camera. This sonar device emits ultrasonic pulses and waits for an echo. The time it takes for the reflected pulses to return is used to calculate distance, velocity, and acceleration. Our Motion Detector has a pivoting head, rubber feet, and a clamp for mounting. In addition, the cable is removable, so you can convert the Motion Detector for use on a different lab interface by using a \$5 cable. (Order codes for additional cables only are CBL-MDC for LabPro, CBL 2 or CBL; ULI-MDC for ULI; and M-MDC for MPLI.)

Range: 0.40 to 6.0 meters
 Resolution: 1 mm

Order Code MD-BTD (for LabPro, CBL, CBL 2) \$64
Order Code MD-ULI (for ULI) \$65



Using a ball toss and the Motion Detector to measure the acceleration due to gravity.



O₂ Gas Sensor



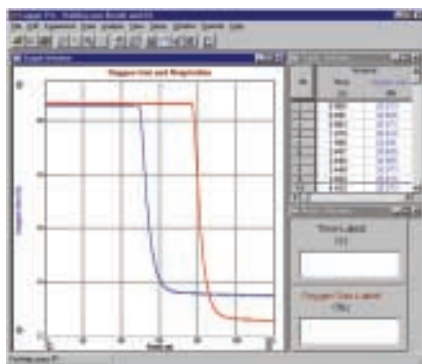
The O₂ Gas Sensor measures oxygen concentration in air. The O₂ Gas Sensor requires no special preparation or calibration—just plug it into your interface and it is ready to take readings.

Many of the experiments currently performed using the CO₂ Gas Sensor can be performed or complemented using the O₂ Gas Sensor. Due to its wide measurement range, the O₂ Gas Sensor can also be used to monitor oxygen concentration during human respiration.

Included with the O₂ Gas Sensor is a 250-mL bottle to be used as a respiration chamber for studying plants and insects, or rusting of iron.

Range: 0 to 27% (0 to 270 ppt)
12-bit Resolution (LabPro): 0.01%
10-bit Resolution (CBL, CBL 2): 0.04%
Accuracy: ±1% volume O₂

Order Code O2-BTA (for LabPro, CBL, CBL 2) \$186
Order Code O2-DIN (for ULI, Serial Box) \$184



Human respiration experiment.

Photogates and Accessories



Vernier Photogates can be used to study free fall, rolling objects, air track collisions, pendula, etc. These inexpensive, ready-to-use photogates are similar to the traditional photogate, but have no stand. They can be easily mounted on a ring stand.

Order Code VPG-BTD (for LabPro, CBL 2) \$43
Order Code VPG-DG (for original CBL, ULI) \$40
(CBL-P adapter required for use with original CBL.)

Super Pulley Attachment



The Vernier Photogate can be converted to function like a Smart Pulley™ by adding a Pulley Attachment.

Order Code SPA \$20

Picket Fence



Our Picket Fence has 8 opaque bars silk-screened at intervals of 5 cm directly onto clear plastic. These devices are especially good for dropping through a photogate to study free fall.

Order Code PF \$5

Bar Tape

Our Bar Tape is a flexible strip 3 m long and 1.6 cm wide with opaque bars spaced every 1.525 cm. This strip can be attached to a dynamics cart and pulled through a photogate, taking the place of a “ticker tape” in many mechanics experiments.

Order Code TAPE \$4

pH Sensor

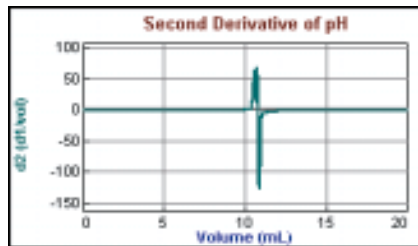
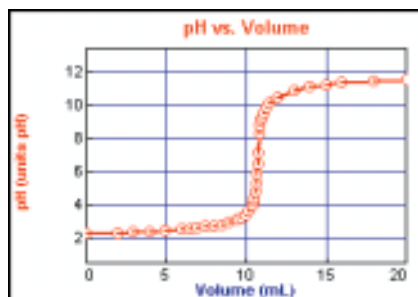


The pH Sensor is a Ag-AgCl combination electrode with a range of 0 to 14 pH units. This high quality electrode has many uses in chemistry, biology, and middle school classes, as well as water quality monitoring.

Included is a convenient soaking bottle with storage solution. pH Buffer Capsules (order code PHB, \$10) and pH Storage Solution (order code PH-SS, \$12) are also available.

Range: 0 to 14 pH units
12-bit Resolution (LabPro): 0.005 pH units
10-bit Resolution (CBL, CBL 2): 0.02 pH units
Accuracy: 0.1 pH with typical calibration

Order Code PH-BTA (for LabPro, CBL, CBL 2) \$74
Order Code PH-DIN (for ULI, Serial Box) \$72



Acid-base titration using a pH Sensor.



SENSORS

Radiation Monitors



Radiation Monitor

(alpha, beta, gamma)

The Radiation Monitor consists of a Geiger-Mueller tube and rate meter mounted in a small, rugged, plastic case. The unit is battery operated and can be used without a computer for measurement of alpha, beta, and gamma radiation. It can be used to explore radiation statistics, measure the rate of nuclear decay, and monitor radon progenies.

Order Code RM-BTD (for LabPro, CBL 2) \$205

Order Code RM-DG (for original CBL, ULI) \$199

(CBL-P adapter required for use with original CBL.)



Student Radiation Monitor

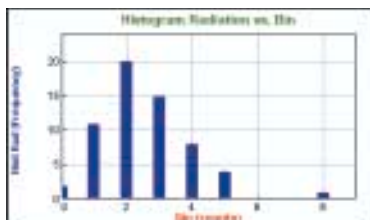
(beta, gamma)

Use this low-cost radiation monitor for beta and gamma radiation. It consists of a Geiger-Mueller tube mounted in a small, rugged case. It can be used to measure the total number of counts per specified timing interval. Your students can investigate topics such as shielding, inverse square law, and half-life.

Order Code SRM-BTD (for LabPro, CBL 2) \$145

Order Code SRM-DG (for original CBL, ULI) \$138

(CBL-P adapter required for use with original CBL.)



Histogram of gamma decay.

Relative Humidity Sensor



The Relative Humidity Sensor contains an integrated circuit that can be used to monitor relative humidity over the range of 0 to 95% ($\pm 5\%$). Use this sensor for weather studies, monitoring greenhouses, or for determining days when static electrical discharges could be a problem.

Range: 0 to 95%
Typical Accuracy: $\pm 5\%$

Order Code RH-BTA (for LabPro, CBL, CBL 2) \$67

Order Code RH-DIN (for ULI, Serial Box) \$65

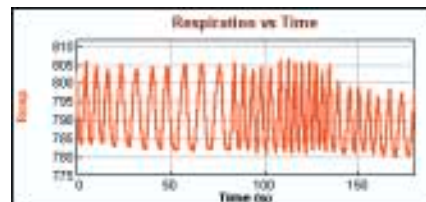
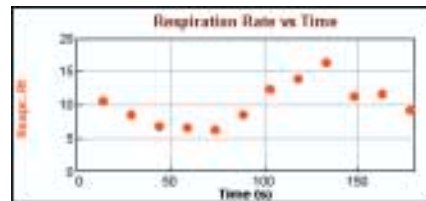


Respiration Monitor Belt



Our Respiration Monitor Belt is used with our Gas Pressure Sensor to measure human respiration. Simply strap the belt around your chest, then pump air into the belt with the pressure associated with the expansion and contraction of your chest during breathing.

Order Code RMB (requires GPS-BTA) \$58



Monitoring respiration rate.





Rotary Motion Sensor

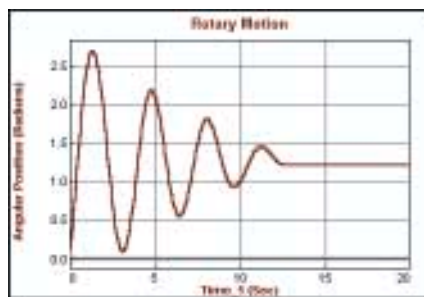


Our Rotary Motion Sensor for LabPro or the ULI lets you monitor angular motion accurately and easily, and is direction sensitive. You can use our *Logger Pro* software to graph angular displacement, angular velocity, and angular acceleration. Typical experiments include measuring moments of inertia, torque, transmission of light through polarizing materials as a function of angle, pendula, and Atwood's machine experiments. Even though we call it a Rotary Motion Sensor, it can also be used to measure linear position to a fraction of a millimeter by simply rolling the pulley of the sensor along a table. The Rotary Motion Sensor was designed in collaboration with the Center for Science and Mathematics at Tufts University.

Standard Resolution (LabPro and ULI): 1.0°
(angular velocity up to 13 rev/sec)

High Resolution (LabPro and ULI): 0.25°
(angular velocity up to 3.25 rev/sec)

Order Code RMS-BTD (for LabPro) \$195
Order Code RMS-ULI (for ULI) \$193



Damped physical pendulum using a Rotary Motion Sensor.

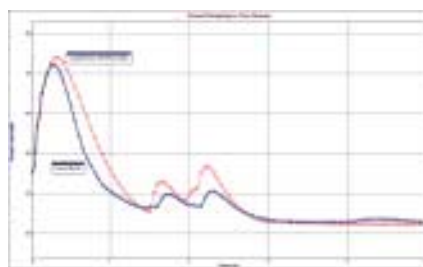
NEW!
Sound Level Meter



The Sound Level Meter is used to record sound level measurements in decibels (dB). An output port on the meter makes it possible to connect the meter to a data-collection interface such as LabPro, Universal Lab Interface, Serial Box Interface, CBL 2 or CBL. A weighting switch on the meter is used to select dBA or dBC weighting. The Sound Level Meter also has an LCD panel, which allows you to use it as a stand-alone device. A dB range switch and a response switch provide flexibility in the stand-alone mode.

Range: 30 to 130 dB
Accuracy: 1.6% at 94 dB
Frequency Response: 31.5 to 8,000 Hz

Order Code SLM-BTA (for LabPro, CBL, CBL 2) .. \$209
Order Code SLM-DIN (for ULI, Serial Box) \$207



Dampening of sound in two rooms.

Temperature Probes



Stainless Steel Temperature Probe

This rugged and durable temperature probe has a sealed stainless steel shaft and tip that can be used in organic liquids, salt solutions, acids, and bases. This probe is the same as the probe shipped with CBL 2.

Note: If you need a temperature probe for use with the ULI, Serial Box Interface, or MPLI, order a Direct-Connect Temperature Probe (order code DCT-DIN, \$28).

Order Code TMP-BTA (for LabPro, CBL, CBL 2) ... \$29

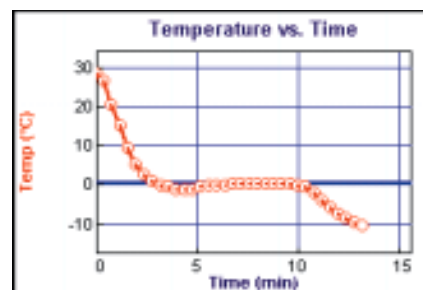
Range: -25 to 125°C	
12-bit Resolution (LabPro):	0.08°C (-25 to 0°C)
	0.03°C (0 to 40°C)
	0.1°C (40 to 100°C)
	0.25°C (100 to 125°C)
10-bit Resolution (CBL, CBL 2):	0.3°C (-25 to 0°C)
	0.12°C (0 to 40°C)
	0.4°C (40 to 100°C)
	1.0°C (100 to 125°C)

Extra-Long Temperature Probe

This probe has a 30-meter (100 ft) cable. It is designed for remote, outdoor temperature sensing or for measuring temperature at various depths in lakes and streams.

Range: -50 to +150°C
12-bit Resolution (LabPro): 0.07°C
10-bit Resolution (CBL, CBL 2): 0.3°C

Order Code TPL-BTA (for LabPro, CBL, CBL 2) \$70
Order Code TPL-DIN (for ULI, Serial Box) \$68



Freezing of water.



SENSORS

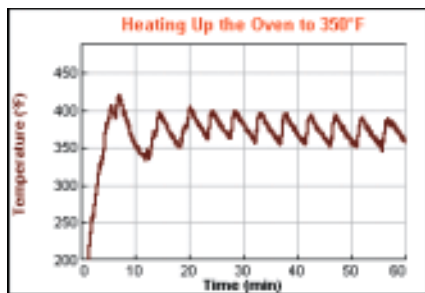
Thermocouple



This probe uses type-K thermocouple wire to measure the difference in temperature between its two junctions. It can be used over the range of -200 to 1400°C ($\pm 10^\circ$). It is great for studying flame temperatures.

Range: -200 to 1400°C
Typical Accuracy: $\pm 10^\circ\text{C}$

Order Code TCA-BTA (for LabPro, CBL, CBL 2) \$37
Order Code TCA-DIN (for ULI, Serial Box) \$35



Temperature cycles of an oven using a Thermocouple.



Use our Thermocouple to measure flame temperatures.

Turbidity Sensor



Use our Turbidity Sensor to measure the turbidity of freshwater or seawater samples. Its small, sleek design and simple setup make it easy to use at the collection site or when you return to the classroom. The Turbidity Sensor measures turbidity in NTU (the standard unit used by most water collection agencies and organizations). Calibration can be done in about one minute using a high-quality Hach StablCal[®] 100-NTU standard (included). Also included is a high-grade glass cuvette for the water sample to be measured.

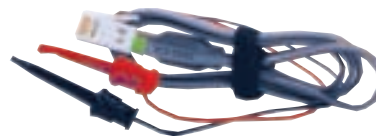
Chemistry and biology teachers can also use this sensor to monitor precipitates formation or algae and yeast populations.

Range: 0 to 200 NTU
12-bit Resolution (LabPro): 0.25 NTU
10-bit Resolution (CBL, CBL 2): 1.0 NTU

Order Code TRB-BTA (for LabPro, CBL, CBL 2) \$99
Order Code TRB-DIN (for ULI, Serial Box) \$105



Voltage Probe



One Voltage Probe is included with each Vernier LabPro, ULI, or Serial Box Interface, as well as with each TI CBL or CBL 2. This sensor can be used just like a standard volt meter. In physics classes, it can be used to measure the potential in direct-current or alternating-current circuits. In chemistry, physical science, or middle school science classes, the voltage probe can be used to measure voltages developed in a variety of electrochemical (voltaic) cells.

VP-BTA
Range: -10 to +10 V
12-bit Resolution (LabPro): 0.005 V (5 mV)
10-bit Resolution (CBL, CBL 2): 0.020 V (20 mV)
VP-DIN
Range: 0 to 5 V
12-bit Resolution (ULI, Serial Box): 0.0012 V (1.2 mV)

Order Code VP-BTA (for LabPro, CBL, CBL 2) \$9
Order Code VP-DIN (for ULI, Serial Box) \$7



Do I Need to Purchase an Adapter?

You do not need an adapter if you are purchasing a LabPro or CBL 2. Simply buy the sensors with order codes that end in “-BTA” or “-BTD” and you’ll be ready to collect data! If you purchased sensors prior to this year, you may need an adapter. This chart should help. If not, call us!

Adapters for Older Vernier Sensors				
Sensor	For Use with LabPro and CBL 2		For Use with Original CBL	
	Adapter or Cable	Price	Adapter or Cable	Price
Analog “-DIN” Sensor	DIN-BTA	\$5.00	DIN-BTA	\$5.00
Motion Detector (with removable cable)	CBL-MDC (cable)	\$5.00	CBL-MDC (cable)	\$5.00
ULI Motion Detector (older, non-removable cable)	CBL-RJ11	\$5.00	CBL-RJ11	\$5.00
Radiation Monitor	RAD-BTD (cable)	\$5.00	CBL-P	\$5.00
Student Radiation Monitor	RAD-BTD (cable)	\$5.00	CBL-P	\$5.00
Rotary Motion Sensor	ROT-BTD	\$5.00	N/A	
Vernier Photogate (with removable cable)	PG-BTD (cable)	\$5.00	CBL-P, \$5.00 or CBL-2P, \$18.00	
Homemade Photogate	HMP-BTD	\$9.00	CBL-P, \$5.00 or CBL-2P, \$18.00	

BT Adapters to Older Interfaces



You can use your new LabPro or CBL 2 sensors, which have BT (British Telecom) connectors, with a Universal Lab Interface or Serial Box Interface. You will need a

BTA to DIN adapter for your analog sensors; for example, PH-BTA would need a BTA-DIN adapter (order code BTA-DIN, \$5.00). If you want to use your new photogates, radiation monitors, or motion detectors with our older interfaces, contact us about a different cable or adapter.

Water Depth Sampler



Use this device to collect water samples from any desired lake depth. You can raise samples to the surface, and make on-site measurements of dissolved oxygen, pH, temperature, or conductivity using Vernier sensors (not included) and a LabPro, CBL 2, or CBL—or take some samples back to the school for testing. The Water Depth Sampler has a unique trigger mechanism that requires only one line to raise and lower the chamber and also to seal the 1.5-liter chamber. A 50-foot nylon drop cord is included.

Water Depth Sampler WDS \$59

DataVest



Since LabPro and CBL 2 are portable data collection devices, many teachers use them outside the classroom. A popular activity is to collect data on amusement park or playground rides with our Low-g Accelerometer, 3-Axis Accelerometer, and/or Barometer. One of the challenges is holding onto the equipment and the ride at the same time. The DataVest is a perfect solution. The vest has a front pouch for the LabPro, CBL 2 or original CBL. It has two inside pockets for the sensors, and side straps to hold the vest in place.

Slots in the interface pouch provide access to the interface so that data can be easily transferred to a computer or calculator after the ride.

This vest was designed after consultation with the engineers and safety officers at a major amusement park and has features like the pockets opening to the inside, which are required for use on rides in some parks. Use of the vest is not limited to amusement parks though. For example you could use it with our Exercise Heart Rate monitor to investigate heart rate during a jog or during a suspenseful movie.

DataVest DV \$26

NEW!

Vernier Neck Strap

No longer will you hear your students say, “Ms. Jones, my LabPro fell in the lake!” The Vernier Neck Strap secures the LabPro or CBL 2 and calculator around your student’s neck. This allows for water quality testing without the risk of dropping the equipment in the water!



Vernier Neck Strap VNS-5 5 straps/\$15

Replacement Parts and Accessories

Part Name	Order Code	Price
Analog Sensor Extension Cable	EXT-BTA	\$12.00
Digital Sensor Extension Cable	EXT-BTD	\$12.00
LabPro or CBL Motion Detector Cable	CBL-MDC	\$5.00
MPLI Motion Detector Cable	M-MDC	\$5.00
ULI Motion Detector Cable	ULI-MDC	\$5.00
CO ₂ Respiration Chamber	CO2-BTL	\$2.50
CO ₂ -O ₂ Tee Adapter	CO2-TEE	\$5.00
Colorimeter Cuvettes (pkg. of 100)	CUV	\$10.00
DIN Extension Cable	EXT-DIN	\$12.00
D.O. Calibration Solution	DO-CAL	\$3.00
D.O. Filling Solution	FS	\$3.00
D.O. Polishing Strips	PS	\$3.00
D.O. Probe Membrane Cap	MEM	\$11.00
EKG Electrodes	ELEC	\$10.00
ISE Ammonium Replacement Module	NH4-MOD	\$54.00
ISE Calcium Replacement Module	CA-MOD	\$54.00
ISE Nitrate Replacement Module	NO3-MOD	\$54.00
ISE Ammonium Low Standard	NH4-LST	\$12.00
ISE Ammonium High Standard	NH4-HST	\$12.00
ISE Calcium Low Standard	CA-LST	\$12.00
ISE Calcium High Standard	CA-HST	\$12.00
ISE Chloride Low Standard	CL-LST	\$12.00
ISE Chloride High Standard	CL-HST	\$12.00
ISE Nitrate Low Standard	NO3-LST	\$12.00
ISE Nitrate High Standard	NO3-HST	\$12.00
LabPro → PC Serial Cable	CBS-IBM	\$5.00
LabPro → Mac Serial Cable	CBS-MAC	\$5.00
LabPro → USB Cable (Mac or PC)	CB-USB	\$5.00
Motion Detector Clamp	MD-CLAMP	\$2.50
pH Buffer Capsules	PHB	\$10.00
pH Electrode (with BNC connector)	7120B	\$32.00
pH Storage Solution (500 mL)	PH-SS	\$12.00
pH Storage Bottles (pkg. of 5)	BTL	\$10.00
Pressure Sensor Accessories Kit	PS-ACC	\$7.00
Pressure Sensor Syringe	SYR	\$1.00
Plastic 3-Way Pressure Sensor Valve	PSV	\$2.00
Plastic Tubing Clamps (pkg. of 100)	PTC	\$20.00
Serial Box → PC Cable	CBS-IBM	\$5.00
Serial Box → Mac Cable	CBS-MAC	\$5.00
Serial Box Power Supply	SBI-PS	\$7.00
Extra-Long Temperature Replacement Probe	TPL	\$40.00
ULI → IBM Cable	CB-IBM	\$7.00
ULI → Mac Cable	CB-MAC	\$7.00
ULI Power Supply	ULI-PS	\$9.00
Vernier AC Adapter (for LabPro, CBL 2 or CBL)	IPS	\$10.00

Digital and Analog Sensor Extension Cables (\$12 each)

Most of our sensors have cables that are 1.5 m long. There are times, however, that you may wish to have a longer cable. The Digital Sensor Extension Cable can be used with any Vernier sensor that connects to a digital channel of LabPro, CBL 2, or CBL, such as Motion Detectors and photogates. The Analog Sensor Extension Cable can be used with any Vernier sensor that connects to an analog channel of LabPro, CBL 2, or CBL. Each cable is 2 meters in length.

Digital Sensor Extension Cable EXT-BTD \$12
 Analog Sensor Extension Cable EXT-BTA \$12

Pressure Sensor Accessories Kit (PS-ACC, \$7)

This kit contains all accessories for performing chemistry and biology experiments using any of the Vernier pressure sensors. The kit contains the following parts:

- one No. 5 rubber stopper with two ribbed, tapered valve connectors
- one No. 1 rubber stopper with one ribbed, tapered valve connector
- one piece of plastic tubing with two Luer-lock connectors
- one two-way valve
- one 20-mL syringe
- two airtight tubing clamps for transpiration experiments

pH Buffer Capsules (PHB, \$10)

To make calibration of our pH measurement system easier, we sell a set of pH buffer capsules. The set contains four capsules each for pH buffers 4, 7, and 10 (total of 12 capsules). These capsules, when added to 100 ml of distilled water, provide a reliable buffer for calibrating your pH system.

ISE Accessories

Replacement Modules (\$54 each)

ISE Replacement Modules are available for Ammonium, Calcium, and Nitrate Ion-Selective Electrodes (see order codes on the left). Note: Chloride does not need a replacement module.

Important: We recommend that you do not purchase replacement modules far in advance of their expected time of use; some degradation occurs while replacement modules are stored on the shelf.

ISE Standard Solutions (\$12 each)

Having accurate standard solutions is essential for performing good calibrations. These 500 mL bottles can be used to replenish the standards that are shipped with Vernier ISEs.

CO₂-O₂ Tee (CO2-TEE, \$5)

This adapter allows you to simultaneously monitor CO₂ and O₂ levels in cell respiration or photosynthesis experiments.



Plastic Tubing Clamps (PTC, \$20/pkg. of 100)

These easy-to-use clamps are great for providing an airtight fit for transpiration experiments.

- A**
AC Adapter 34
Accelerometers 43
 25-g Accelerometer 43
 3-Axis Accelerometer 43
 Low-g Accelerometer 43
Accessories 53, 54
Activity Based Physics CD 32
Adapters
 AC Power 34
 Adapter Chart 53
 BT 53
 CBL-DIN 36
 Digital 53
 DIN-to-BTA 36, 53
 Photogate 53
 Radiation Monitor 53
Ammonium ISE 47
Ammonium Replacement Module 54
Apple II Products 56
- B**
Bar Tape 49
Barometer 43
Biology Packages 14-15, 37
BTA-to-DIN adapter 53
- C**
Cables 54
Calcium ISE 47
Calcium Replacement Module 54
Calculator-Based Ranger (CBR) 34
Calculator-to-Calculator Link Cable 35
CBL 2 33-40
CBL 2 Packages 37-40
CBL-DIN Adapter 36
CBR 34
CBR Workbooks 34
 Math and Science in Motion: Activities for the Middle School 34
 Modeling Motion: High School Math Activities with the CBR 34
Chemistry Packages 12-13, 40
Chloride ISE 47
CO₂ Gas Sensor 43
CO₂-to-O₂ Tee 54
Colorimeter 44
Colorimeter Cuvettes 44, 54
Comprehensive Science Packages 28-29
Conductivity Probe 44
Conferences 2
Current Probe 44
- D**
Data Logger Software 41
DataVest 53
Differential Voltage Probe 44
Digital Control Unit 10
DIN-to-BTA Adapter 36, 53
Direct-Connect Temperature Probe 42
Dissolved Oxygen Probe 45
Dissolved Oxygen Probe Accessories 54
Do-It-Yourself Programming 10
Dual-Range Force Sensor and Accessories 45
- E**
Earth Science Packages 24-25, 40
EKG Electrodes 45
EKG Sensor 45
Exercise Heart Rate Monitor 46
Extension Cables 54
Extra-Long Temperature Probe 51
- F**
Flow Rate Sensor 42
Force Sensors 41
 Dual-Range Force Sensor 41
Force Sensor Accessories 41
- G**
Gas Pressure Sensor 46
Graphical Analysis 3.0 Software 8-9
Graphing Calculators 34, 35
 TI-73 Graphing Calculator 34, 35
 TI-83 Plus Graphing Calculator 34, 35
 TI-83 Plus Silver Edition 34, 35
 TI-86 Graphing Calculator 35
 TI-89 Graphing Calculator 35
 TI-92 Plus Graphing Calculator 35
Graph Link Cable 35
- I**
Instrumentation Amplifier 47
Interactive Lecture Demonstrations 32
Ion-Selective Electrodes 47
ISE Replacement Modules 54
ISE Standard Solutions 54
- L**
Lab Books
 Amusement Park Physics 32
 Biology with Calculators 15, 30
 Biology with Computers 15, 30
 Chemistry with Calculators 13, 30
 Chemistry with Computers 13, 30
 College Physics with the CBL and TI-86 36
 Data Collection Activities for the Middle Grades with the CBL 2 and TI-73 36
 Interactive Lecture Demonstrations 32
 Middle School Science with Calculators 19, 31
 Middle School Science with Computers 19, 31
 Nuclear Radiation with Computers and Calculators 31
 Physical Science with Calculators 23, 31
 Physical Science with Computers 23, 31
 Physics with Calculators 17, 30
 Physics with Computers 17, 30
 Real-World Math with Computers 27, 31
 Real-World Math with the CBL 2 and LabPro 27, 31
 RealTime Physics 32
 Tools for Scientific Thinking 32
 Water Quality with Calculators 21, 30
 Water Quality with Computers 21, 30
 Workshop Physics 32
LabPro 6-7, 33
LabPro Packages 12-29
Light Sensor 47
Logger Pro Software 7
- M**
Magnetic Field Sensor 48
Math Packages 26-27, 37
Microphone 48
Middle School Packages 18-19, 39
Motion Detector 48
Motion Detector Cables 48
- N**
Nitrate ISE 47
Nitrate Replacement Module 54
- O**
O₂ Gas Sensor 49
- P**
Packages 12-21, 37-40
 Biology 14-15, 37
 Chemistry 12-13, 40
- Packages (cont.)
 Comprehensive 28-29
 Earth Science 24-25, 40
 Math 26-27, 37
 Middle School 18-19, 39
 Physical Science 22-23, 38
 Physics 16-17, 38
 Water Quality 20-21, 39
pH Buffer Capsules 54
pH Electrode 54
pH Sensor 49
pH Storage Bottles 54
Photogate and Accessories 49
Physical Science Packages 22-23, 38
Physics Packages 16-17, 38
Picket Fence 49
Plastic Tubing Clamps 54
Power Supplies 34, 54
Pressure Sensor Accessories Kit 54
Pressure Sensor Syringe 54
Pressure Sensor Valve 54
- Q**
Quick-Start Package 5
- R**
Radiation Monitor 50
RealTime Physics 32
Relative Humidity Sensor 50
Respiration Monitor Belt 50
Rotary Motion Sensor 51
- S**
Sensors 42-52
Serial Box Interface 41
Site License Policy 56
Sound Level Meter 51
Spectro Pro 10
Stainless Steel Temperature Probe 51
Super Pulley Attachment 49
Student Radiation Monitor 50
- T**
Temperature Probes 42, 51
 Direct-Connect Temperature Probe 42
 Extra-Long Temperature Probe 51
 Stainless Steel Temperature Probe 51
Thermocouple 52
TI-Calculator Teacher Packs 34, 35
TI-GRAPH LINK 35
TI InterActive! 35
TI-Presenter 34, 35
TI-ViewScreens 34, 35
TI-ViewScreen Calculators 34, 35
Tools for Scientific Thinking 32
Training 2-3
Turbidity Sensor 52
- U**
ULI Data Collection Software Package 41
Universal Lab Interface (ULI) 41
- V**
Vernier LabPro 6-7, 33
Vernier Photogate 49
Vernier Neckstrap 53
Vernier Training CD 1, 2
ViewScreens 34, 35
Voltage Probe 52
- W**
Warranty Information 56
Water Depth Sampler 53
Water Quality Packages 20-21, 39
Workshop Physics 32
Workshops and Training 2-3

GENERAL INFORMATION

Vernier has been selling science software and laboratory interfacing hardware since 1981. We pride ourselves on the quality and affordability of our products and our service to our customers. If, at any time, you are unhappy with any of our products or service, please call, write, or e-mail.

Vernier Site License

We have a very generous site license policy. Purchase of one copy of any Vernier program entitles you to install it on every computer in your school or college department (including the school network). Purchasers of *Logger Pro*, *Graphical Analysis 3.0*, and *Spectro Pro* are also permitted to distribute these programs to their students or teachers for home use.

TI InterActive! License

TI InterActive!™ Software is licensed by Texas Instruments Incorporated under a separate agreement. The license agreement is based upon the configuration purchased. Licenses can be purchased for several different configurations, including single user and multiple educational user configurations. Refer to the TI InterActive! software packaging for the complete license agreement.

Technical Support

We publish a periodic newsletter, *The Caliper*, with information on upgrades, suggestions for new ways to use our programs, and announcements of new products. We are readily available to help you with individual questions about our software or interfacing hardware—simply write, call, or e-mail.

Preview Policy Guarantee

Most Vernier products are available for a 30-day preview to educational institutions.

Any product that does not meet your needs may be returned within 30 days for a full refund, subject to the Equipment Return stated below. Equipment returned after 30 days may be subject to a restocking fee.

Warranty

All Vernier products carry a one-year limited warranty against defects in materials and workmanship. **In our 20 years, we have rarely charged a customer for repairs, except in cases of misuse.** All Texas Instruments products are covered by a one-year limited warranty against defects in materials or workmanship.

Equipment Return

A Return Authorization, available from Vernier, is required for any product return. Equipment returned for exchange or credit must be in new condition and in its original packaging. Any item returned must be shipped prepaid. Items returned after 30 days of purchase may be subject to a restocking fee.

Product Usage

All Vernier products are designed for educational use only. Our equipment is not designed or recommended for research or any industrial or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

International Sales

Most sales of Vernier products outside the U.S. and Canada are handled by Ed.USA, Siesta Key, 5136 Calle Minorga, Sarasota, FL 34242, (941) 349-1000, fax (941) 349-2766, www.ed-usa.com, info@ed-usa.com.

Canadian customers may order direct from Vernier or contact CCS Educational, Inc., 24 Rogate Place, Scarborough, Ontario, Canada M1M 3C3, toll free (877) CCS-EDUC, phone/fax (416) 267-8844, www.ccseducational.com, ccs@ican.net.

Prices and Shipping

Prices are effective January 1, 2002 and supersede any previously published prices. Prices are in U.S. dollars and are F.O.B. Shipping Point. Shipping charges may vary, depending on method of shipment. Prices are subject to change without notice.

Apple II Products

We sold our first Apple II product 21 years ago, and we still have Apple II products available. Contact us for a copy of our Apple II catalog.

Trademarks

Logger Pro and *Vernier LabPro* are registered trademarks of Vernier Software & Technology in the United States of America.

Macintosh and Apple II are registered trademarks of Apple Computer, Inc.

IBM is a registered trademark of International Business Machines Corp.

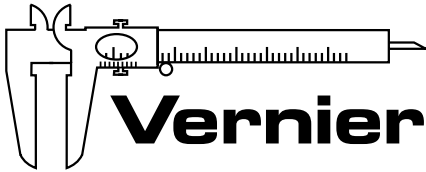
MS-DOS, Visual Basic, Windows, Windows 95, Windows 98, Windows 2000, Windows ME and Windows NT are registered trademarks of Microsoft Corporation.

REALbasic is a registered trademark of REAL Software, Inc.

Smart Pulley is a trademark of PASCO scientific.

Calculator-Based Laboratory, CBL, CBL 2, Calculator-Based Ranger, CBR, TI-GRAPH LINK, ViewScreen, TI InterActive!, TI-Presenter, Teachers Teaching with Technology, and T³ are trademarks of Texas Instruments.

LabVIEW is a registered trademark of National Instruments Corporation.



Vernier Software & Technology
 13979 S.W. Millikan Way • Beaverton, OR 97005-2886
 Phone: 503-277-2299 • Fax: 503-277-2440
 e-mail: orders@vernier.com • www.vernier.com

ORDER FORM

BILL TO

Attn: _____
 Office _____
 Address _____

 City/State/Zip _____
 Phone _____

SHIP TO

Name _____
 Institution _____
 Address _____

 City/State/Zip _____
 Phone _____

Date _____ Customer No. _____ E-mail _____

Payment Method: Check Enclosed School Purchase Order # _____
 MasterCard/Visa Exp. Date _____ Authorized Signature _____
 Card Number Print name as it appears on card _____

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Quantity	Item	Order Code	Unit Price	Total

Estimated Shipping and Handling U.S. orders: 3% (\$8.00 minimum) Canadian orders: 5% (\$10.00 minimum)	Please add shipping and handling TOTAL
---	--

Prices are in U.S. dollars and are F.O.B. shipping point.
 Prices are subject to change without notice.

Vernier Software & Technology


Back Forward Reload Home Search Images Print Security Stop

Location: <http://www.vernier.com/>


Vernier

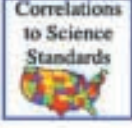
Home
Orders
News
Products
Support
Workshops
Downloads
Search

**Check out what's new at
www.vernier.com**

 **Free software updates**

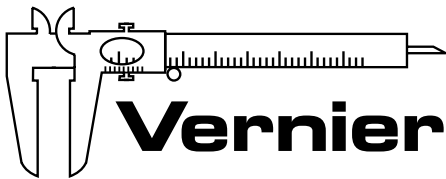
 **Share your ideas on the Idea Board**

 **Free sample experiments**

 **Free correlations to national and state science standards**

 **Free download of sensor booklets**

VERNIER WORKSHOPS Find out where we'll be and register online



Vernier Software & Technology
 13979 SW Millikan Way
 Beaverton, OR 97005-2886
 phone: 503-277-2299 • fax: 503-277-2440
 info@vernier.com • www.vernier.com

PRSRT STD
 U.S. POSTAGE
 PAID
 Medford, OR
 Permit No. 348