VERNIER SOFTWARE & TECHNOLOGY

The Caliper

Volume 19 Number 2 Fall 2002

The Caliper is a publication for users of Vernier products

2002 OREGON BUSINESS 100 BEST COMPANIES TO WORK FOR

IN THIS ISSUE

NEW! Earth Science Books Now Available!

We are pleased to announce the latest additions to our popular line of lab books—*Earth Science with Computers* and *Earth Science with Calculators*. Each book contains 33 experiments for Earth Science topics of geology, hydrology, oceanography, meteorology, energy, and basic soil and water analysis. Introducing technology into an Earth Science course allows your students to experience phenomena previously only discussed in text books. Examples include

- Measuring the UV-blocking capabilities of sunglasses, sunscreens, or clothing using our new UVB Sensor.
- Investigating solar power and wind power using our new Current Probe.
- Examining models of magnetic reversals as evidence of sea floor spreading using a Magnetic Field Sensor.
- Exploring dew point, wind chill, and the Greenhouse Effect using Temperature Probes.
- Studying the effect of evaporation and river outflow on ocean salinity using a Conductivity Probe.
- Exploring the effect acid rain has on various types of soil and surface water using a pH Sensor.

Not only are there 33 experiments using 10 different sensors, but there are also several long-term investigations included. The calculator version of the book contains four projects in meteorology using our Temperature Probes, Barometer, and Relative Humidity Sensor.

For the teacher interested in a complete weather station, we are now offering the Davis Vantage Pro. Davis weather stations are easy to use, reliable, and reasonably priced. See p. 2 for more details and pricing information.

Earth Science with Computers ..... Order Code ESC-LP **$45**
Earth Science with Calculators ..... Order Code ESCALC **$45**

Continued on next page

Graphical Analysis Receives Award of Excellence

Vernier Software & Technology is the recipient of *Technology & Learning* magazine's 2002 Award of Excellence for Graphical Analysis 3. The Award of Excellence recognizes the best K-12 educational software and related technologies. This year, 27 winners were selected from over 120 product submissions. Graphical Analysis is available for $80 and includes a school and student site license.

TECHNOLOGY & LEARNING WINNER AWARDS OF EXCELLENCE 2002

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Experiment 29: Seasons and Angle of Insolation

Our Earth Science lab books contain the following experiments:

Using a Temperature Probe
- Introduction to Data Collection
- Soil Temperature
- Water Quality—Temperature
- Freezing of Ocean Water
- Reflection and Absorption of Light
- The Greenhouse Effect
- Land and Sea Breezes
- Relative Humidity
- Dew Point
- Wind Chill
- Seasons and Angle of Insolation
- Fossil Fuels
- Solar Homes

Using a Light Sensor
- Reflection and Absorption of Light
- Photovoltaic Cells

Using a pH Sensor
- Soil pH
- Soil and Acid Rain
- Water Quality—pH
- Water Treatment
- Acid Rain and Its Effects on Surface Water

Using a Conductivity Probe
- Soil Salinity
- Water Quality—Total Dissolved Solids
- Water Treatment
- Salinity of Ocean Water
- Desalination

Using a Motion Detector
- Mapping the Ocean Floor

Using a Turbidity Sensor
- Water Quality—Turbidity
- Water Treatment

Using a UVB Sensor
- Are All Sunglasses Created Equal?
- ✔ Comparing Sunscreens
- UV Light and Clothing

Using a Magnetic Field Sensor
- Exploring Magnetism
- ✔ Where IS North?
- Searching for Iron Ore
- Sea Floor Spreading

Using a Current Probe
- Photovoltaic Cells
- Wind Power

Using a Voltage Probe
- Photovoltaic Cells
- Wind Power

✔ Available free on our web site!

LabPro Earth Science Packages

Interface and Sensors	Starter Package EARTH-STR	Deluxe Package EARTH-DX
LabPro Interface	$220	$220
(2) Stainless Steel Temperature Probes	2@29 = $58	2@29 = $58
Light Sensor	$45	$45
pH Sensor	$74	$74
UVB Sensor	$99	$99
Voltage Probe *(included with LabPro)*	$0	$0
Conductivity Probe		$89
Current Sensor		$37
Magnetic Field Sensor		$54
Turbidity Sensor		$99
Motion Detector		$64
Package Price	**$496**	**$822**

Earth Science Packages for CBL 2 are also available. See our web site for details.

NEW! Davis Weather Stations

As part of our product line for Earth Science teachers, we are now carrying the Vantage Pro® line of weather stations manufactured by Davis Instruments. These weather stations include an indoor weather console that monitors barometric pressure, indoor temperature and relative humidity, and an outdoor monitoring station. The monitoring station contains a rain collector, temperature sensor, humidity sensor, and anemometer. The weather stations come in a standard model or a Vantage Pro Plus model, which includes a UV sensor and a solar radiation sensor. The Davis Vantage Pro weather stations come in cabled versions and wireless versions. Visit our web site for more information (www.vernier.com/weather). While visiting this site you can also check out the current weather information at our office in Beaverton, Oregon, measured with a Vantage Pro weather station.

Vantage Pro Wireless Weather Station ..... Order Code DWVP **$595**
Vantage Pro Plus Wireless Weather Station ..... Order Code DWPLUS **$995**
See our web site for additional weather stations and accessories.

NEW! UVA and UVB Sensors

Have you ever wondered if you can get a sunburn on a cloudy day? Or whether those cheap sunglasses let ultraviolet light through? Investigate these issues and others with the new UVA and UVB Sensors from Vernier. Two different UV Sensors are available—one responds primarily to UVA radiation (approximately 320 to 390 nm), and another responds primarily to UVB radiation (290 to 320 nm).

You can perform the following kinds of experiments:

- Compare ultraviolet transmission of various plastics and glasses.
- Compare ultraviolet intensity on cloudy and sunny days.
- Study the absorption of ultraviolet by sunscreen lotions and clothing.

UVB Sensor ..... Order Code UVB-BTA *(for LabPro, CBL 2, CBL)* **$99**
Order Code UVB-DIN *(for ULI, Serial Box)* **$101**
UVA Sensor ..... Order Code UVA-BTA *(for LabPro, CBL 2, CBL)* **$98**
Order Code UVA-DIN *(for ULI, Serial Box)* **$100**

NEW! Vernier Drop Counter

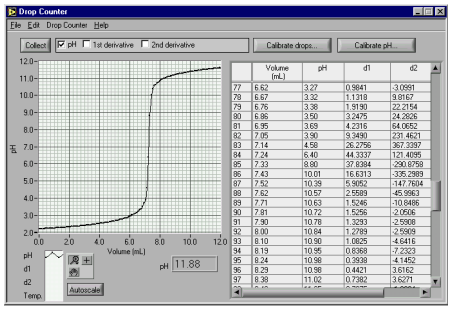
Your students will be able to perform fast, easy, accurate titrations with the Vernier Drop Counter. This new product takes the tedium out of titrations, leaving time for your students to focus on the chemistry. Working in conjunction with a LabPro and a Windows or Macintosh computer, the Drop Counter accurately records the number of drops of titrant added during a titration. The Drop Counter software can automatically convert the number of drops into volume. It will also record pH and temperature values and calculate the first and second derivatives of the pH for easy equivalence point determination. See our sample data below.

The Drop Counter can also be used for conductimetric or potentiometric titrations using our Conductivity Probe, Ion-Selective Electrodes or any electrode with a 0- to 5-volt output. You could even use it instead of a utility clamp anytime you need to hold an electrode in place.

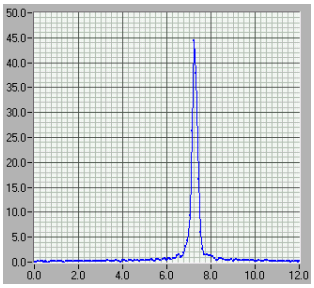
The Vernier Drop Counter can be used with your own buret or with the dispensing vessel that is included. This vessel was designed to keep the drop size consistent and to make drop rate regulation simple and easy.

The Drop Counter includes a cable, software, and a dispensing vessel. It will be available in early December.

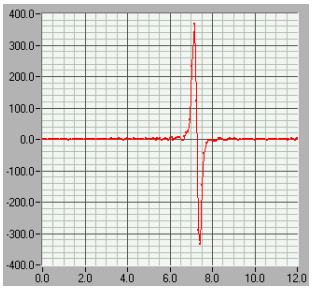
Vernier Drop Counter ..... Order Code VDC-BTD **$88**



pH vs. volume of acid-base titration using the Vernier Drop Counter.



First derivative of pH.



Second derivative of pH.

NEW! A Faster DataMate

We have been working with Texas Instruments to develop a faster version of the DataMate application, which is our general-purpose, data-collection program for TI handhelds. This new version is now available for the TI-83 Plus. The improved DataMate has been bundled with the most recent LabPro operating system. This update can be downloaded (free) from our web site at www.vernier.com/calc/glupdate.html.

NEW! TI Keyboard

The TI Keyboard is an affordable, full-sized, touch-typing keyboard that brings basic word-processing and note-taking capabilities to TI handhelds. With the TI Keyboard, your students can take notes and prepare reports directly on the TI-83 Plus and TI-83 Plus Silver Edition. They can then access their files by downloading them into Microsoft Word. The TI Keyboard comes with a cradle and a link cable, 3 AAA batteries, and a guidebook. The package also includes a CD that has the NoteFolio App, NoteFolio Conversion software, and operating system upgrades for the handhelds.

TI Keyboard ..... Order Code TI-KEY **$38**

Graphical Analysis 3.1

The new version of Graphical Analysis (3.1.1 for Windows and 3.1 for Macintosh) is now available. It has these new features:

- Macintosh OS X is supported.
- Data can be imported from a Palm or Visor handheld using Data Pro software.
- Data can be imported from the LabPro interface using a serial or USB cable.
- Graphics (pictures) can be inserted into Graphical Analysis files.

This version is available as a free download on www.vernier.com to purchasers of Graphical Analysis 3.0. For those with a version of Graphical Analysis earlier than 3.0, it is a $40 upgrade (order code UGA) and for new purchasers, it is $80 (order code GA). Windows, Mac OS 9, and Mac OS X versions are included on the CD. The purchase price includes a site license for your entire school, or college department, including the instructor's and students' home computers.

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Vernier

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Can You Tan in Your Van?

An experiment using the new Vernier UVA and UVB Sensors

Have you ever wondered if you were getting a suntan or sunburn through your car window? The new Vernier UVA and UVB Sensors let you and your students find out! Suntans are generally produced by UVA radiation (320 to 400 nm) while sunburns are usually attributed to UVB radiation (290 to 320 nm). While UVB used to be the only one to get a bad rap, recent studies have shown that leathery skin, wrinkles, and several types of skin cancer are associated with both UVA and UVB radiation.

In this experiment, we measured the percent UVA and UVB radiation from direct sun exposure passing through the front windshield and side door windows of three different cars. The tests were made around noon on a cloudless day in Portland, Oregon. (That's right, it doesn't always rain here!) The surprising results from the UVA Sensor, shown in Figure 1, indicate that the side windows transmitted 3 to 4 times as much UVA as the front window. The results from the UVB Sensor, shown in Figure 2, show that less than 1% of the UVB radiation is transmitted in every case but one. Our conclusions are: Yes, you can get a tan in your van. It will, however, probably come from the side window rather than the front window. As far as a sunburn—probably not.

These results are explained by the differences in the components used in the manufacturing of car windows. Most front windshields are made of laminated safety glass that consists of a thin layer of flexible clear plastic film called polyvinyl butyral (PVB) between two or more pieces of glass. The plastic holds the glass in place when the windshield breaks. It also blocks UVB radiation. The glass used in windows on the side and rear of automobiles is tempered glass. Tempered safety glass is a single piece of glass that is put through a process of heating and cooling during manufacture that strengthens the glass up to ten times that of regular glass. It also causes the glass to shatter when broken into many pebble-like pieces without sharp edges, rather than sharp shards like regular glass. Since the tempered glass lacks the thin plastic film found in windshields, UV radiation is not blocked. Plastic films are available to apply to the windows of your car that manufacturers claim block up to 99.9% of UV radiation.

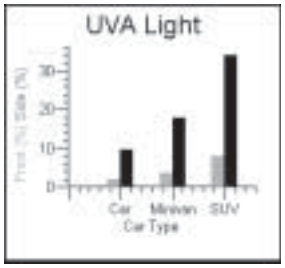


Figure 1
Percent UVA light passing through front and side car windows

= side
= front

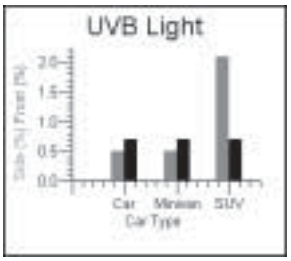


Figure 2
Percent UVB light passing through front and side car windows

LabVIEW™ and LabPro
(Open Source Code)

We have continued to work with LabVIEW as a way to program LabPro. Why are we working with LabVIEW when we have a full-featured program, Logger *Pro*, for data collection with LabPro? Here are some reasons why you may be interested in using LabVIEW with LabPro:

- We offer a collection of simple data-collection and control programs (called Virtual Instruments, or VIs) on our web site at www.vernier.com/labview. These VIs can be used as they stand or modified by LabVIEW programmers. We are treating this as "open source" code. If users make improvements to the VIs, we will incorporate them in the future. This can be a great way for instructors or students to do custom programming for projects using LabPro.
- It is a great way to teach data collection and programming in a modern, graphic, object-oriented language. Many upper-level college physics and chemistry programs introduce their students to LabVIEW. There are two sessions planned at the winter AAPT meeting on using instrumentation to teach physics.
- We now offer simple Linux data collection with LabPro (see below).
- We can produce very specific, stand-alone applications in Windows, Macintosh, and Linux®. Two examples on our web site are Function Generator and Drop Counter. You do not need to own LabVIEW, unless you want to modify the functionality.

Linux Data Collection

We have a number of stand-alone applications for use with Linux on our web site at www.vernier.com/linux. You do not need to own LabVIEW, unless you want to make changes. These applications include

- Simple data-collection programs that allow you to collect data with most of our sensors.
- Function Generator: A program that allows you to turn your LabPro into a simple function generator with six waveforms, frequency, and amplitude control.
- Drop Counter: For use by chemistry students doing titrations and similar experiments. It supports our new Drop Counter hardware.

LabVIEW with LabPro Workshop

There will be a three-day, hands-on workshop for high school and college physics instructors on using LabVIEW with LabPro on April 3-5, 2003 at Lee College in Baytown, TX. This workshop is being organized by Curt Hieggelke and Tom O'Kuma, who have conducted dozens of successful workshops around the country. An instructor from National Instruments and David Vernier of Vernier Software & Technology will be assisting. Check out http://tycphysics.org for more information on how to apply.

Logger *Pro* 2.2.1 Available

Logger *Pro* 2.2.1 is now available from our web site. This is a free update from previous versions of Logger *Pro*. We have added support for the UVA and UVB Sensors, the Force Plate, and other new sensors. An updated USB driver resolves problems with changes to Windows 2000. We recommend that all Logger *Pro* users update to 2.2.1.

Innovative Uses

An interesting article by Inge H. A. Pettersen (Stavanger, Norway) called "Speed of Sound in Gases Using an Ultrasonic Motion Detector" appears in the May 2002 issue of *The Physics Teacher*. It provides a good lesson in how motion detectors work, and on how the speed of sound varies. The motion detector is placed pointed upward inside a large bucket with a lid. Normally it reads the distance to the lid, as you would expect. But what happens if you vary the temperature of the air inside the bucket, or inject CO_2 (from dry ice) into the bucket? An original CBL was used for the experiments described, but they can also be done with a LabPro or CBL 2.

There is a very interesting article on "Bridge Swinging and the Maximum Tension in a Pendulum String" by Edward P. Wyrembeck (Howards Grove HS, WI) posted on our Vernier Idea Board. In this article, Edward and his students explain how they measure the maximum tension in a pendulum string and compare the results to the theoretical model. The Vernier Idea Board is a place for teachers and students to post ideas on how to use Vernier products that might be useful to others. Go to www.vernier.com and click on Idea Board.

The September 2002 issue of *The Physics Teacher* was full of articles that relate to Vernier products:

"The Hard Drive: An Experiment for Faraday's Law" by Brad Hinaus and Mick Veum (University of Wisconsin-Stevens Point) used Logger *Pro* and our Voltage Probe to nicely demonstrate how a computer hard drive operates.

"Interfacing Microcomputers: Back to the Future" by Marvin De Jong (College of the Ozarks, MO), has an interesting history of the early days of MBL, including early Vernier products. It also shows how to build some homemade sensors using modern equipment.

"A Friction Experiment" by Leo Takahashi (Penn State Beaver, PA) shows a way to do the friction lab in our *Physics with Computers* lab book in a different way with improved results.

In the October 2002 issue of *The Physics Teacher*, there was an article by Chris A. Gaffney and David Kagan (California State University, Chico) entitled "Beats in an Oscillator Near Resonance." In this article, they study the motion of sinusoidally-driven mass-spring system. Their experiment is a good lesson in resonance and related issues. The great thing about it is that you can drive the oscillator (a small speaker with a hook glued on) using LabPro and our Function Generator program (free on our web site).

Shelly Nash (Sioux City West HS, IA) has sent us lots of good ideas for open-ended student investigations using LabPro. She says, "One of the major things Vernier equipment does for me is allow my students to wonder about things and then make measurements regarding their scientific nature." Some of the topics investigated by her students include:

- What is the pressure at the bottom of the school swimming pool?
- How do temperature, pressure, and relative humidity vary with altitude?
- How does the force exerted on the bottoms of your feet vary as you ride an elevator? (We investigated that one ourselves. See page 7 of this newsletter.)

The January, April, and May, 2002 issues of *The Mathematics Teacher* contain three interesting "Technology Tips" from Bob Ruzich, a mathematics teacher at Fenton HS in Bensenville, IL. The January issue contains an article entitled "The arithmetic of calculus: list and the rates of change." In this tip, Bob describes a mathematical analysis of distance data collected with a motion detector to understand velocity and acceleration. The April tip is entitled "The arithmetic of calculus: sum to average value of a function area under the curve." He describes the use of a Voltage Probe to explore AC voltage and the associated RMS voltage. In the third installment, "The arithmetic of calculus: cumulative sum to velocity and distance," Bob uses an accelerometer to measure acceleration and then works backward to develop the corresponding velocity and position functions. In each of these activities, the math student uses the data to further explore the analysis features of the TI-83 Plus.

Fifteen Years Ago in *The Caliper*

We introduced our first pH Sensor and we had a detailed comparison of the game ports on various models of Apple II computers. Most of our data collection was done via the Apple II game port in those days.

Ten Years Ago in *The Caliper*

We introduced two new sensors—a Heart Rate Monitor and our Student Force Sensor. We also reported that Coleman lantern mantles were no longer being made with thorium compounds. This meant science teachers had lost one of their favorite radioactive sources for demonstrations. Fortunately, other brands of mantles are still made with thorium, even today, so you can still get a good radioactive source at most outdoor supply stores.

Five Years Ago in *The Caliper*

We announced that our Serial Box Interface and sensors could be used with the new eMate computer from Apple. Logger *Pro* was a fairly new program in those days, and we were proud to announce that it won the "Software Award of Excellence" from *Technology & Learning* magazine.

Modeling in Mathematics

A new book (with CD), *Lessons in Mathematics—A Dynamic Approach* by Diana M. Fisher, includes lessons to help teachers of math or science incorporate modeling activities into their curriculum. Many of the lessons involve motion detector data capture and icon-based model building with STELLA software. This book is available from High Performance Systems, Inc., www.hps-inc.com.

Science Humor

Q: What did the nuclear physicist have for lunch?
A: Fission chips.

Q: What did the thermometer say to the graduated cylinder?
A: "You may have graduated, but I've got many degrees."

Mike Adams (Eastern Connecticut State University) has done a fascinating study of The Dead Grandmother/Exam Syndrome. He has found that a student's grandmother is far more likely to die suddenly just before the student takes an exam, than at any other time of year. He backs this up with charts and graphs. For details, go to http://biology.ecsu.ctstateu.edu/People/ConnRev

NEW! Use Your Visor™ Handheld with LabPro

We are pleased to announce that you can now use your Visor handheld from Handspring™ to collect data with our LabPro interface. Our Visor handheld package includes the following:

- Data Pro 1.1 software on CD
- Visor-to-LabPro pouch
- Visor-to-LabPro cable

This package supports the following Visor handhelds: Visor Platinum, Visor Prism, and Visor Pro.

We recommend Palm OS 3.3 or newer for use with Data Pro 1.1 and Visors.

Here are just a few features of the Data Pro software:

- Supports more than 30 Vernier sensors. You can use up to 4 different analog sensors or 2 digital sensors at the same time.
- Performs curve fits (linear, power, quadratic, exponential).
- Provides statistical analysis or integration of data.
- Students can model data with a wide variety of data.
- Data are easily transferred to Vernier Graphical Analysis 3.1, using a HotSync® cradle.

Note that this package does not support other Visor models, such as the Deluxe, Edge, or Treo™. We do not anticipate supporting these models in the near future.

Data Pro Visor Package for Handspring ..... Order Code DP-VH **$79**

NEW! Vernier Lab Book for Palm and Visor Handhelds

We will soon be releasing a new lab book entitled *Science with Handhelds*. This book will have 41 experiments in the following subject areas:

- Biology/Life Science (9 experiments)
- Chemistry (9 experiments)
- Earth Science (9 experiments)
- Physics (9 experiments)
- Water Quality (5 tests)

These experiments support our new Data Pro data collection program for Palm and Visor handhelds. The labs in the book include the very best experiments from eight of our previous lab books, as well as teacher information for each experiment. Included is a CD that has all of the word-processing files for each student experiment (in Microsoft Word) to allow you to edit any experiment to meet your personal teaching style.

This 360-page book will be available November 1.

Science with Handhelds ..... Order Code SWH **$45**

Software Upgrade for Palm Handhelds

In addition to support for Visor handhelds, Data Pro 1.1 offers other new features. Here are just a few of the features:

- Stores up to 19 data files.
- PDA power stays on during a long data collection.
- Data retrieval from LabPro is faster.
- Exponential and power curve-fits are better.
- Graph autoscaling is improved.
- Support for the UVA and UVB sensor is included.

If you have already purchased Data Pro 1.0, you can upgrade to version 1.1 two different ways:

- Go to our web site, www.vernier.com, click on Downloads, and proceed to Data Pro 1.1 upgrades. To perform the upgrade, you need to be on a computer on which Data Pro 1.1 has been previously installed.
- Call or e-mail us and request a Data Pro 1.1 CD.

Vernier Welcomes NSTA to Portland!

We encourage you to attend this year's Northwestern Regional NSTA in Portland, OR November 14-16. There are many reasons to visit Portland. Not only is it a beautiful city (even in the rain!), but it is the home of Powell's Books, the biggest bookstore in the country. AND, we have more microbreweries than any other city in the United States! Oh, and did we mention that Portland is the home of Vernier Software & Technology?

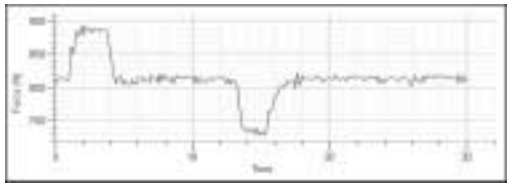
To celebrate your arrival in town, we have planned the following events. You are cordially invited to all of them!

- In partnership with the Oregon Museum of Science and Industry (OMSI), Vernier Software & Technology will host a gala "Evening at OMSI" on November 14. Dinner will be served and you will have the opportunity to explore OMSI's exhibits, the OMNIMAX theater, and the OMSI Planetarium. Tickets are $10 if purchased by October 11. (Use the order form on p. 27 of the NSTA Area Convention Advance Program or go to www.nsta.org/conventions.)
- Tour the headquarters of Vernier Software & Technology on Friday, November 15 from 1-4 p.m. See demonstrations of Vernier's newest products and visit Dave Vernier's personal museum of products past. The tour tickets are $5. (Use the order form on p. 27 of the NSTA Area Convention Advance Program or go to www.nsta.org/conventions.)
- Visit us in Booth #514 in the Exhibit Hall.
- Attend one of our five free hands-on workshops on Friday.

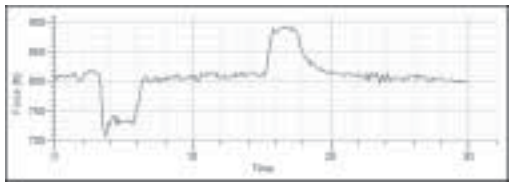
We look forward to seeing you in November!

The Ups and Downs of Riding an Elevator with our Force Plate

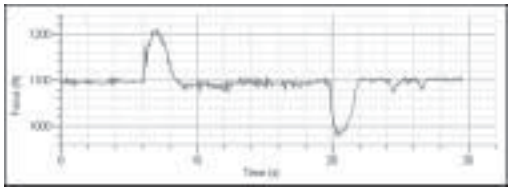
When teaching the concept of weight, physics teachers like to discuss what a person would weigh in a moving elevator. Quite often this involves a thought experiment, and the discussion is based around the feelings a person has experienced on an elevator. Now you can collect actual weight data in an elevator with our Force Plate. Here is a graph of a person's apparent weight as an elevator moved upward. The graph shows that the person's "initial" weight was around 810 N. As the elevator accelerated upward, his weight increased to about 890 N, which is close to a 10% increase. When the elevator stopped, the weight decreased again by about 10%.



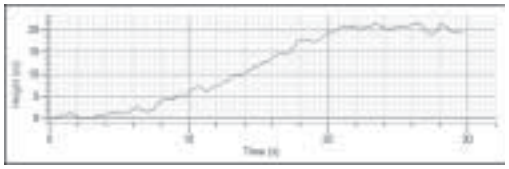
Here is a graph showing the same person's weight as the elevator descended. As the elevator began its motion, the person's weight decreased, and as the elevator stopped, the weight increased. As in the upward trip, this elevator produced around a 10% change in weight. It is interesting to notice the shape of the graph as the elevator came to a stop. The elevator produced a sharp change in weight as it slowed down, but then there is a gradual, almost exponential-like, change in weight. This same behavior can be seen while moving in either direction.



Here is a set of graphs from a different elevator. On this occasion, we used a Force Plate to measure weight, a Low-g Accelerometer to measure acceleration, and a Barometer to measure height. This elevator services nine floors in a local hotel and takes about 20 seconds to go from the first floor to the ninth floor. The first graph shows the weight of a person as the elevator traveled from the ground level to the ninth floor. Like the elevator described above, this elevator also produced about a 10% change in weight. We don't know if this is coincidental or a common design criteria. As we rode this elevator a number of times, we observed its operation. The elevator did not immediately go to the intended floor and open the door. Instead, it seemed to slow down in advance of the floor, and then repositioned itself to bring it level with the hotel floor. The force graph even shows this adjustment. Notice the force changes at 22.4 s and 23.4 s.



The next graph is a height calculation based on the barometric pressure readings. It shows an increase in height of about 21 m.



We performed additional analysis using the accelerometer that we carried on this ride. That analysis looked at the relationship between force and acceleration. We also integrated the acceleration data to calculate changes in velocity and position. If you are interested in seeing our results, read the long version of this article, available at www.vernier.com/caliper.

Workshops at Mass Academy

"A Couple of Days of Mathematics and Science Technology Exploration" will be held October 18-19 at Massachusetts Academy of Math and Science in Worcester, MA. Concurrent workshops, freebies, and door prizes are included in the $50 registration fee. A special deal for participants includes a TI-83 Plus Teacher Calculator and a CBL 2 for only $200. Contact Jacklyn Bonneau at bonneau@wpi.edu for more details.

Vernier Celebrates Mole Day 2002!

Back by popular demand, the Vernier Mole Day Contest is on for 2002. Here is how it works: You and your students (minimum 1 teacher and 5 students) gather on Mole Day morning, October 23. The first class to call Vernier at precisely 6:02 a.m. in your time zone wins. (Eastern, Central, Mountain, and Pacific Time Zones only…if you live outside of these time zones, use the one nearest you.) We will have our clocks set according to the National Institute of Standards and Technology. They can be found at http://nist.time.gov/. The winning class in each time zone will receive a Vernier Mini-Slinky for each student (maximum of 40) and a Vernier t-shirt for the teacher. But remember, no fair calling us early. After all, would you accept 6.01×10^{23} for Avogadro's number?

Note to Windows 2000 Service Pack 3 Users

Changes introduced by the SP3 update (released by Microsoft on August 1, 2002) have caused problems with the Vernier products Logger *Pro* 2.1, 2.1.1, and 2.2, and Graphical Analysis 3.1.

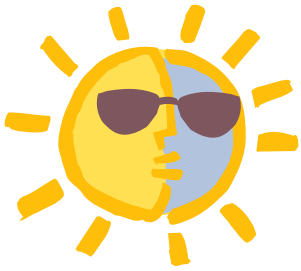
The USB driver for the LabPro interface, supplied with both Graphical Analysis and Logger *Pro*, functions properly with all versions of Windows other than Windows 2000 SP3. When SP3 was released, we learned that the driver will prevent some PCs running Windows 2000 SP3 from starting properly.

There is any easy solution! If you have upgraded or plan to upgrade your Windows 2000 computer to SP3, please refer to our technical support web page at www.vernier.com/tech for information on how to update your software. The new versions, Logger *Pro* 2.2.1 and Graphical Analysis 3.1.1. are also compatible with Windows XP Service Pack 1, released on September 9, 2002.

We are committed to keeping our software compatible with new versions of Windows or Mac OS, and will issue updates as necessary. If you did not get our e-mail about SP3, it means we do not have a current e-mail address for you. We can add that information to your account if you send an e-mail to info@vernier.com.

Visit Us at These Conferences!

Two-Year College Chemistry Conference (2YC3)	Farmington, CT	Oct. 4-5
Northwest Math Conference	Portland, OR	Oct. 10-12
Alabama Science Teachers Association	Birmingham, AL	Oct. 10-12
New Jersey Science Convention (NJSC)	Somerset, NJ	Oct. 15-16
Long Island Science Education Leadership Association	Uniondale, NY	Oct. 16
Florida Association of Science Teachers (FAST)	Sarasota, FL	Oct. 17-19
Eastern Regional NSTA	Louisville, KY	Oct. 24-26
Metro Detroit Science Teachers Association	Detroit, MI	Oct. 26
California Science Teachers Association (CSTA)	San Francisco, CA	Oct. 24-27
Mississippi Science Teachers Association	Jackson, MS	Oct. 28-29
National Association of Biology Teachers (NABT)	Cincinnati, OH	Oct. 30-Nov. 2
National Middle School Association (NMSA)	Portland, OR	Oct. 31-Nov. 2
Science Teachers Assoc. of New York State (STANYS)	Ellenville, NY	Nov. 3-5
South Carolina Science Council	Myrtle Beach, SC	Nov. 7-8
Illinois Science Teachers Association (ISTA)	Pheasant Run, IL	Nov. 7-9
Conference for the Advancement of Science Teaching	El Paso, TX	Nov. 7-9
Science Teachers' Association of Ontario (STAO)	Toronto, Canada	Nov. 7-9
Virginia Association of Science Teachers (VAST)	Richmond, VA	Nov. 8-9
Two Year College Chemistry Conference (2YC3)	Kansas City, KS	Nov. 8-9
ASA-CSSA-SSSA	Indianapolis, IN	Nov. 10-14
North Carolina Science Teachers Association (NCSTA)	Greensboro, NC	Nov. 13-15
Technology & Learning	Dallas, TX	Nov. 13-15
Northwestern Regional NSTA	Portland, OR	Nov. 14-16
AMATYC	Phoenix, AZ	Nov. 14-17
NYSCATE	Buffalo, NY	Nov. 24-26
Southwestern Regional NSTA	Albuquerque, NM	Dec. 5-7



Want to Host a Vernier Summer Workshop?

We are looking for schools that are interested in hosting a Vernier workshop next summer. These 6-hour workshops take place in June, July, and August. We provide the equipment and trainers. You provide a classroom where we can accommodate up to 30 people. As host of a Vernier Summer Workshop, you will be allowed the first 10 spaces in the workshop. You will also receive a gift certificate for $500 that can be used towards anything in our catalog. The application form can be found on the Workshops section of our web site.

Vernier
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Beaverton, OR 97005-2886
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ADDRESS SERVICE REQUESTED