

# Vernier Science Education

K-12 Catalog  
2024



For science educators, by science educators



# Thank you, from our hearts to yours.



You've shared a passion with us for inspiring students and furthering their interest in STEM careers, and for this we are so grateful.



## Vernier Volunteers

As a company, we volunteer for organizations such as Habitat for Humanity, The Humane Society, Oregon Museum of Science & Industry, Portland Symphony, Oregon Public Broadcasting, LEGO® Robotic Tournaments, Meals-on-Wheels, The Nature Conservancy, Oregon Food Bank, and many other organizations.

Vernier employees are encouraged to volunteer for non-profit organizations of their choice on company time and receive four hours of pay each month for their volunteer time. Vernier employees regularly volunteer at schools—teaching children to read, teaching art literacy, and helping with field trips and other school functions.



# Welcome!

Dear educator,

We hope this catalog finds you well and thriving in your classroom. It has been a roller-coaster year! We are thrilled to share some exciting announcements that signify a new chapter in our journey of supporting educators and promoting STEM literacy.

First, we are embarking on a remarkable transition from being a partner-owned company to a Perpetual Purpose Trust. This strategic move will enable us to sustain our mission indefinitely, ensuring that we continue to assist teachers in creating a STEM-literate society. Our commitment to providing durable products and solutions, offering unwavering quality and service, and giving back to the communities we serve and live in remains steadfast. With this change, we know it will remain the same in perpetuity.

This transition was prompted by John Wheeler stepping down from his role as CEO. Although he will no longer be leading the company, he will continue to offer his invaluable guidance and leadership to the organization, supporting our new CEO in maintaining our commitment to your needs and the support of STEM education. Dave and Christine Vernier will also continue to play key roles.

After more than a year of managing the supply chain crisis, we are thrilled to be creating new and exciting tools for teachers again. This year, we are adding new products including Go Direct Salinity, Go Direct Soil Moisture, Go Direct Pyranometer, Go Direct PAR, Go Direct Force Plate, and a Cart Fan.

As always, we are committed to supporting your educational objectives and are excited about the opportunities these new resources bring to your classroom. Thank you for your continued dedication to teaching, and we look forward to continuing to serve your needs in this new chapter of our journey.

**John Wheeler**  
CEO

**Dave Vernier**  
Co-Founder

**Christine Vernier**  
Co-Founder

## About Vernier Science Education

Vernier Science Education was co-founded in 1981 by Dave and Christine Vernier. Dave's background as a physics teacher and Christine's knack for business combined to form a company with a deep commitment to education.

Vernier is proud to be recognized for its philanthropic commitment, environmental policies, steady growth, and as one of the Best 100 Companies to Work For in Oregon for more than 25 years.



2023 Best Companies to Work For in Oregon



2023 Healthiest Employers of Oregon



2023 Best Green Companies in Oregon

## Contents

02	What's New
04	Vernier Connections™
06	Getting Started
08	Software
12	Interfaces
16	High School
18	Biology
24	Environmental Science
30	Earth Science
34	Chemistry
40	Physical Science
42	Physics
58	Engineering and Coding
60	Math
62	Middle School
68	Elementary School
70	Sensors & Accessories
74	Index
Inside back cover	STEM Classroom

For college products, visit [vernier.com/college](https://vernier.com/college)

## 10 Tips for Writing Your Best Grant Proposal

We understand that grants are essential for obtaining the supplies, tools, and resources necessary to address the many needs of your students.

This year, with school budgets in such a precarious place, securing grant funding means you and your students can have the support needed to thrive, no matter where learning takes place.

We have created an infographic with 10 tips for grant writing to help you perfect your proposal with newfound confidence.

In addition, discover tips and opportunities for funding your K-12 STEM projects in our updated grant-writing guide. This comprehensive resource includes best practices for writing a successful grant proposal, as well as over 100 upcoming national and state-specific funding opportunities.



[vernier.com/grants](https://vernier.com/grants)

# What's New



## Vernier Connections™

**NEW**

### Vernier Connections

Vernier Connections deepens students' understanding of scientific concepts and develops critical skills such as inquiry, problem solving, communication, and collaboration. Phenomenon-based, three-dimensional lessons combine the benefits of web-based learning with hands-on investigation.

[Learn more on page 4.](#)



**NEW**

### Transform Your Classroom into a Forensic Lab

Forensics and its real-world applications are engaging vehicles for learning key scientific concepts. Students investigate make-believe scenarios, such as suspected arson and poisoned glasses of wine, while they learn the vital role that analyzing and interpreting data play in science.

*Forensic Chemistry Experiments* is for teachers who wish to introduce their students to forensic science using realistic laboratory experiments with Vernier technology.

HSB-FCHEM \$41

[vernier.com/hsb-fchem](http://vernier.com/hsb-fchem)



**NEW**

### Resonance Apparatus

The Resonance Apparatus is used for the classic experiment of determining the speed of sound using the principle of resonance in a tube that is closed at one end. Fill the apparatus with water and use a tuning fork or the included speaker to produce sound.

RES-APP \$199

[vernier.com/res-app](http://vernier.com/res-app)

# What's New

**NEW**

## Go Direct Salinity

Go Direct® Salinity precisely measures the total dissolved salt content of ocean or brackish water.

GDX-SAL \$180

[vernier.com/gdx-sal](http://vernier.com/gdx-sal)



**NEW**

## Go Direct Soil Moisture

This sensor uses capacitance to measure the volumetric water content of soil.

GDX-SM \$149

[vernier.com/gdx-sm](http://vernier.com/gdx-sm)



**NEW**

## Go Direct Pyranometer

Go Direct Pyranometer measures the power of electromagnetic radiation. It is sensitive to near infrared, visible, and UV radiation, where 90% of solar energy is concentrated.

GDX-PYR \$299

[vernier.com/gdx-pyr](http://vernier.com/gdx-pyr)



**NEW**

## Go Direct PAR

Go Direct PAR (Photosynthetically Active Radiation) measures photosynthetic light levels in both air and water.

GDX-PAR \$299

[vernier.com/gdx-par](http://vernier.com/gdx-par)



**NEW**

## Go Direct Force Plate

Measure the forces developed during stepping, jumping, and other human-scale actions. Observe change in apparent weight as you ride an elevator or measure reaction forces as you lean against a wall.

GDX-FP \$399

[vernier.com/gdx-fp](http://vernier.com/gdx-fp)



**NEW**

## Cart Fan

The Cart Fan is a modular fan you can add to DTS and Go Direct carts that provides a constant force for dynamics investigations. Using one or multiple fans on a single cart allows students to investigate constant acceleration, balanced/unbalanced forces, and variable thrust angles.

DTS-CFAN \$89

[vernier.com/dts-cfan](http://vernier.com/dts-cfan)





## Inspiring future generations of STEM-literate citizens

Web-based, interactive lessons designed to put hands-on investigation at the heart of students' learning

Vernier Connections deepens students' understanding of scientific concepts and develops critical STEM skills such as inquiry, problem solving, communication, and collaboration. Connections' phenomenon-based lessons can be used to facilitate independent and cooperative learning or integrated into whole-class instruction. Formative assessment tasks focus on student reasoning and are designed to provide evidence of mastery of the three-dimensional elements.



3D learning  
designed for  
the NGSS

**TEKS**

Aligned to  
the TEKS



Delivers  
relevant & accessible  
content



Integrates with  
your LMS

Connections lessons keep students engaged as they progress through an inquiry cycle. Students are empowered to explore observable phenomena and their causes, develop explanations, and draw connections to their everyday lives.

### Key features include

**A content library** that can be filtered by standard, topic, completion time, Vernier sensor, keyword, and more to quickly find the right lesson

**Hands-on investigations** that leverage Vernier sensors to develop students' skills in collecting and analyzing experimental data

**Formative assessment** with automated feedback integrated throughout the lesson so students can monitor and adjust their own learning

**Real-time progress monitoring tools** that make it easy for teachers to quickly identify students in need of support and topics in need of review

Time-saving **automated grading** and one-click grade passback to the LMS

**Coming Spring 2024**  
[vernier.com/connections](http://vernier.com/connections)

# Getting Started

## A Guide to Vernier Data Collection

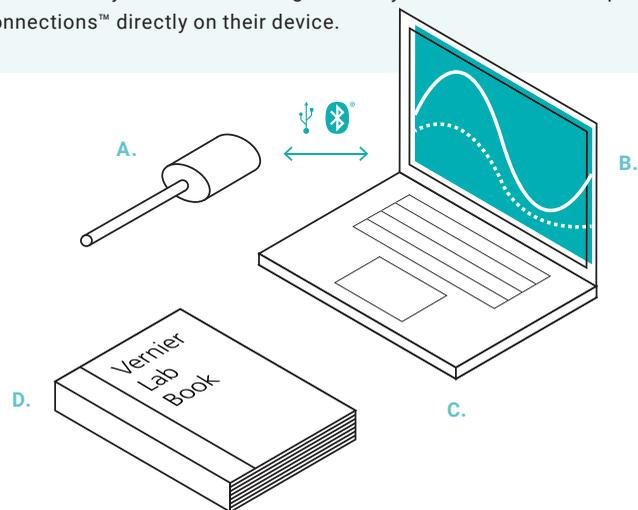
Our data-collection technology helps students to record and analyze data from real-world phenomena and make critical connections with concepts and practices that support the development of scientific and critical thinking skills as well as real-world applications of science. Get to know our range of STEM solutions designed to inspire scientific curiosity and support student success.

[vernier.com/getting-started](https://www.vernier.com/getting-started)



## Why Choose Go Direct Sensors?

Go Direct® sensors are an ideal fit for schools with one-to-one computing solutions. These sensors can connect to any Bluetooth® wireless technology-enabled device—like laptops, Chromebooks, or tablets—or connect via a wired USB connection. The flexible, wireless connection makes it easy for students to log and analyze data in Vernier Graphical Analysis® or Vernier Connections™ directly on their device.



### What You Need to Get Started

#### A. Go Direct Sensor

These versatile sensors connect to your device via Bluetooth wireless technology or USB.

#### B. Vernier Graphical Analysis Pro

With Vernier Graphical Analysis Pro, students can collect, graph, analyze, and share scientific data collected from Vernier sensors.

Learn more at

[vernier.com/graphical-analysis](https://www.vernier.com/graphical-analysis)

#### Vernier Connections

Connections' phenomenon-based lessons can be used to facilitate independent and cooperative learning or be integrated into whole-class instruction.

[vernier.com/connections](https://www.vernier.com/connections)

#### C. Device

Go Direct sensors connect to a wide variety of devices commonly used in classrooms, including Chromebooks, computers, compatible mobile devices, and LabQuest® 3.

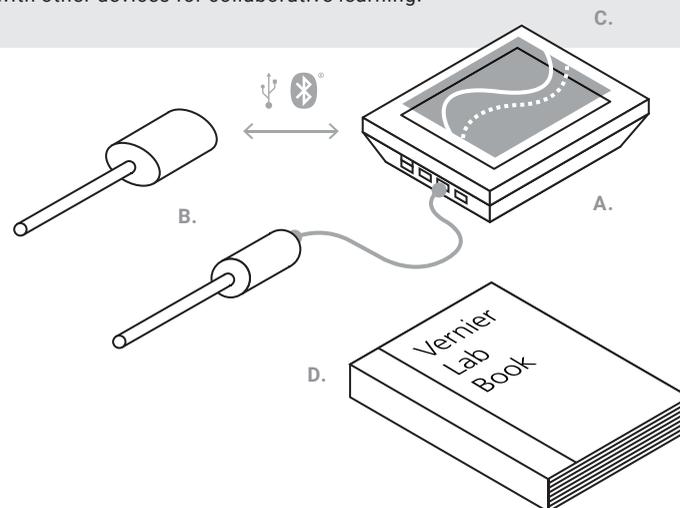
#### D. Lab Book

Step-by-step instructions at your fingertips save valuable time when integrating probeware into your curriculum. Many of our lab books provide support for Go Direct sensors and the Graphical Analysis app.

Our lab books come with a generous site license. Purchase once and share files school wide.

## Why Choose LabQuest 3?

LabQuest 3 is an ideal solution for schools looking to provide students with an easy-to-use data-logging device. The built-in data-collection and analysis app works with all Vernier sensors, including LabQuest and Go Direct sensors. And as a standalone device, it minimizes on-screen distractions, while still allowing students to share data in real-time with other devices for collaborative learning.



### What You Need to Get Started

#### A. LabQuest 3

With its large, high-resolution screen, LabQuest can be easily navigated using gestures. It also offers fast data collection, wireless connectivity with Wi-Fi and Bluetooth wireless technology, and a rechargeable, high-capacity battery.

#### B. Sensors

Compatible with all Vernier sensors, LabQuest 3 connects wirelessly with the family of Go Direct sensors and connects easily to our wired LabQuest sensors.

#### C. Software

LabQuest 3 has built-in software, LabQuest App, that gives your students real-time graphing and analysis capabilities in one handheld device. LabQuest 3 also offers built-in apps, such as a Periodic Table, Sound Recorder, and more, and includes student instructions for over 75 of our most popular experiments.

#### D. Lab Book

Looking for even more lab ideas? Our popular, award-winning lab books provide hundreds of well-tested, customizable experiments.

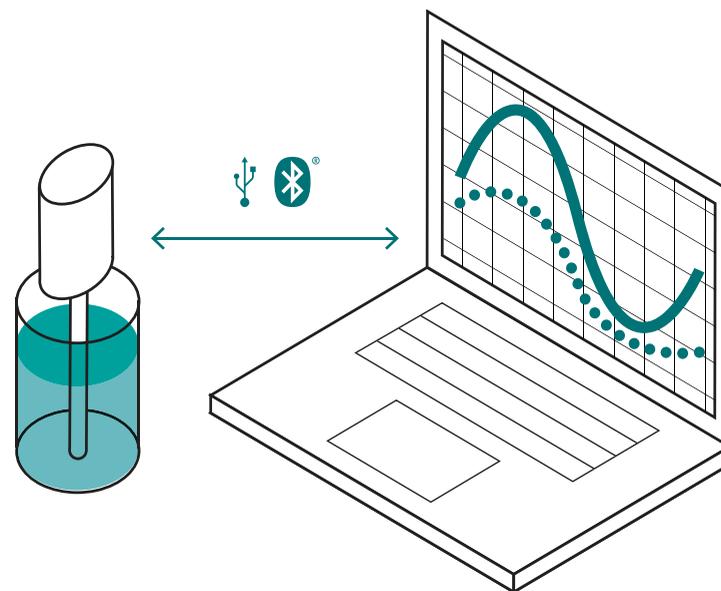
Our lab books come with a generous site license. Purchase once and share files school wide.

LEARN MORE ABOUT LABQUEST 3 ON PAGE 12.

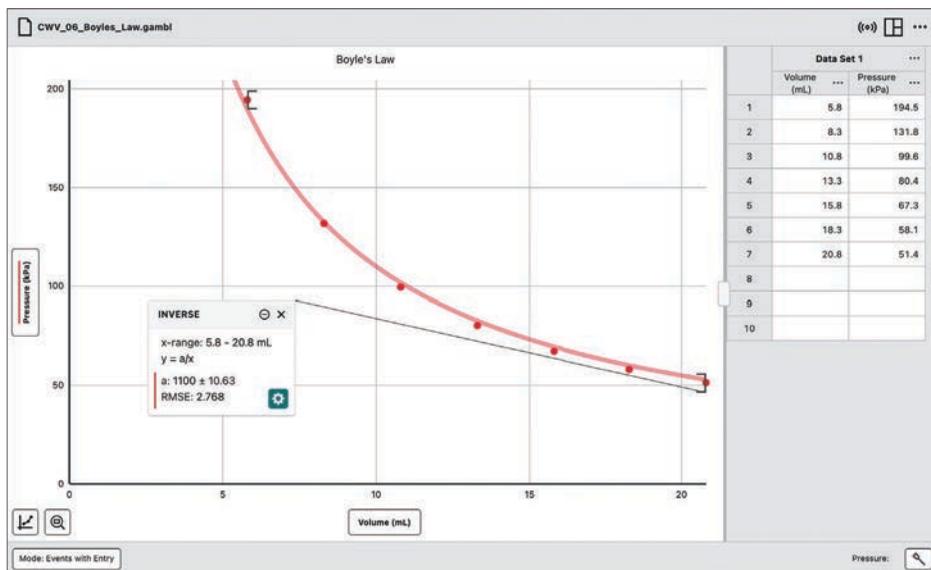
# Vernier Graphical Analysis Pro

Deepen students' understanding of natural phenomena through meaningful interaction with data.

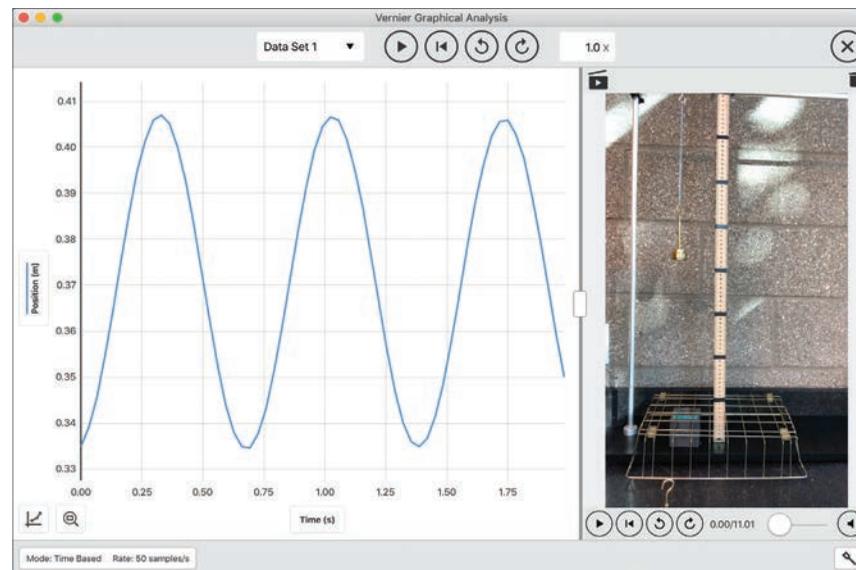
With the Vernier Graphical Analysis® app, students can visualize and interact with experiment data collected via nearly any Vernier sensor. Unlock key features with Graphical Analysis Pro and do more with your Vernier sensors to deepen and extend learning. With access to Pro, you can enrich live instruction while providing more opportunities for students to interact with and analyze data outside of class time.



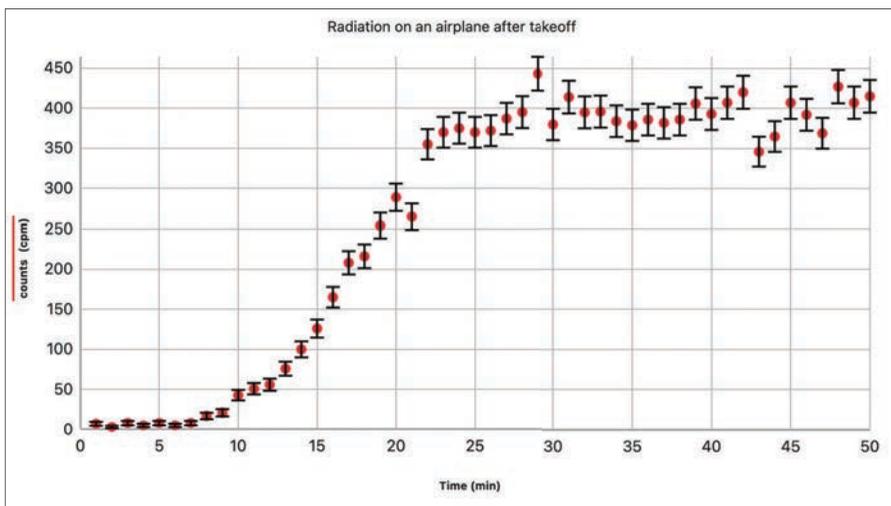
## Awards



Choose curve fits from a library of functions or define your own equation. Display uncertainty of fit parameters.



Data display is synchronized with the video, allowing students to replay, speed up, slow down, and pause recorded experiments at key moments.



Use advanced analysis features, such as error bars, to describe measurement uncertainty.

“The data-sharing feature is outstanding.  
The engagement is so much better  
when doing demo labs.”

— John Kunishima  
Robert O. Townsend Junior High  
Chino Hills, CA

## FREE 30-DAY TRIAL

Get a 30-day free trial and learn about site license options and e-books at [vernier.com/gapro](https://www.vernier.com/gapro)

For more information, go to [vernier.com/graphical-analysis](https://www.vernier.com/graphical-analysis)

## Key Features

With the Graphical Analysis app, students can visualize and interact with experiment data collected via nearly any Vernier sensor.

### Graphical Analysis Pro features that teachers love

**Live data sharing** during demonstrations—great for in-person and remote learning

**More graph types**, including bar, histogram, and FFTs, plus the ability to plot categorical items

**Video-sensor data sync**, which enables students to replay, speed up, slow down, and pause recorded experiments at key moments in time

**Library of over 45 sample experiments** ready to be analyzed by students as prep work, homework, or a makeup assignment

**Graph annotations** so students can demonstrate their comprehension of the graph—and the underlying scientific concepts

**Custom curve fits** that enable students to fit a function of their choosing to experimental data

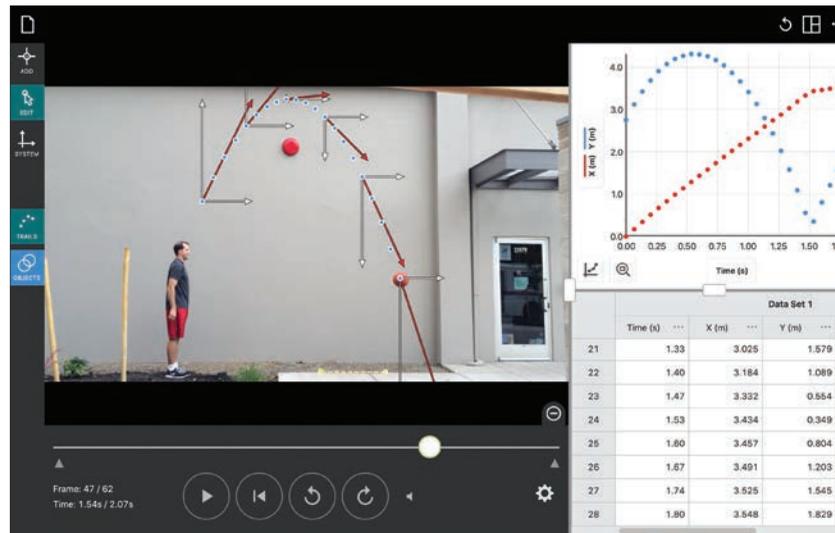
# Vernier Video Analysis



WORKS ON  
CHROMEBOOKS!



Investigate projectile motion.



## Study Motion Everywhere

Vernier Video Analysis® helps students make connections between the classroom and the real world. With this streamlined app, students can use videos they find or record their own with mobile devices to measure motion of objects that they can't measure with a sensor.

### FREE 30-DAY TRIAL

Get a 30-day free trial and learn about site license options and e-books at [vernier.com/video-analysis](https://www.vernier.com/video-analysis)

## Features

- Vernier Video Analysis app is compatible with multiple browsers and platforms: ChromeOS™, Windows®, macOS®, iOS, iPadOS®, and Android.™
- Students can use prepared videos, found videos, or their own videos for analysis.
- The app makes it possible to do experiments that cannot be done with sensors, such as analyzing the motion of a basketball in flight—objects can be tracked automatically by the app.
- Analysis is easy with multiple graphing options, so students are able to think critically about the collected data—they can even analyze the motion of multiple objects in a single video.
- With this app, you can apply vectors and vector components over the video after tracking a moving object, illuminating changes in position, velocity, and acceleration.
- When multiple objects have been marked, just enter their masses and the app can automatically calculate and display the center of mass location.
- Annual site-licensing makes purchasing and renewing quick and easy.

## Vernier Video Analysis: Motion and Sports

Vernier Video Analysis: Motion and Sports features 12 investigations using Vernier Video Analysis. In addition to traditional physics concepts such as velocity and acceleration, its investigation of sports activities expands learning opportunities and further connects the study of motion to students' daily lives.



**Download only**  
HSB-VVAMS-E  
\$28

## Vernier Video Analysis: Conservation Laws and Forces

This e-book features 12 investigations dealing with topics such as conservation of energy and momentum using the Vernier Video Analysis app.



**Download only**  
HSB-VVACLF-E  
\$28

## Vernier Spectral Analysis



### Collect, Share, and Analyze Spectrometer Data

The free Vernier Spectral Analysis® app makes it easy to incorporate spectroscopy into your biology, chemistry, and physics experiments. Using the app, students can collect a full spectrum and explore topics such as Beer's law, enzyme kinetics, and plant pigments.

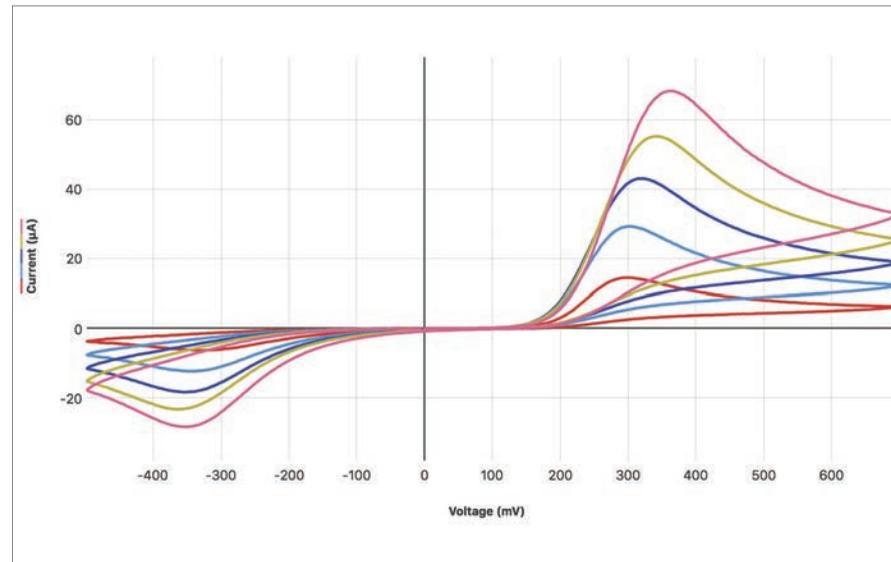
Compatible with ChromeOS, Windows, macOS, iOS, iPadOS, and Android.

#### Features

- Follow on-screen instructions for simplified Beer's law or kinetics data collection.
- Collect full absorbance spectrum or percent transmittance data in less than one second.
- Analyze data with built-in analysis tools, including data interpolation and curve fits.
- Determine the order of kinetics reaction with the calculated columns function.
- Understand color transmission using the color strip shown on full spectrum graphs.
- View a full spectrum of your sample while collecting data for Beer's law or kinetics experiments.
- View spectral lines by collecting intensity vs. wavelength data.

Learn more at [vernier.com/spectral-analysis](https://www.vernier.com/spectral-analysis)

## Vernier Instrumental Analysis



### Incorporate Instrumentation into Your Curriculum

Our free Vernier Instrumental Analysis® app makes it easy to incorporate instrumentation into your chemistry curriculum. With this app, students can collect and analyze data from Mini GC, Mini GC Plus, Go Direct Mini GC™, Go Direct Cyclic Voltammetry System, and Go Direct Polarimeter using computers, Chromebooks, or other mobile devices.

Compatible with ChromeOS, Windows, macOS, iOS, iPadOS, and Android.

#### Features

- Perform peak integration.
- Split peaks present in your gas chromatograms.
- Determine peak retention time and area.
- Capture and analyze polarimetry data to identify optically active compounds.
- Directly measure the optical rotation value of a sample in your polarimeter at a single point or over time.
- Analyze, save, and export gas chromatography, voltammetry, and polarimetry data.
- Explore electrochemistry and redox reactions with voltammograms.

Learn more at [vernier.com/instrumental-analysis](https://www.vernier.com/instrumental-analysis)

# LabQuest 3



LabQuest 3 is a powerful, easy-to-navigate, and versatile data-logging solution for STEM students.

LabQuest® 3 reimagines data collection by providing students with an innovative, easy-to-use interface. A larger screen and advanced touch screen abilities make it easier for students to collect, graph, and analyze data wherever they are—in the classroom or in the field. Challenge your students to gain a deeper understanding of science through data with the accessible, groundbreaking LabQuest 3.

- Connects wirelessly to the family of Go Direct® sensors
- Easy-to-use platform enables students to generate graphs and analyze results
- An excellent choice for laboratories, classrooms, or in-the-field investigations

LABQ3 \$399

*LabQuest 3 purchase includes LabQuest 3 unit, rechargeable battery (in unit), AC power adapter, micro USB computer connection cable, and Quick-Start Guide*



## Full-Featured Data-Collection Platform

The most engaging and effective approach to science is interactive, with students collecting and analyzing data to understand and apply core concepts. Graphing and analyzing data is an essential component of the inquiry and learning process. LabQuest 3, with its built-in data-collection and analysis app that works with all Vernier sensors, supports hands-on data collection in the classroom, in the lab, and in the field.

- Is a Chromebook™ not available? No problem. LabQuest 3 can do it all—data collection, data analysis, and data sharing.
- Keep your expensive computers safe from spills, drops, and crashes—use LabQuest 3 in the chemistry lab, at the watershed, or next to your bridge tester. LabQuest 3 does not need another device for data collection or analysis.
- With a portable design, your students take it anywhere they go.
- LabQuest 3 works with both Go Direct and wired LabQuest sensors.



## Connectivity to Other Platforms

### One-to-Many Data Sharing

Students can share real-time data with multiple devices for a truly hands-on, collaborative learning experience. Use LabQuest 3 to transfer data wirelessly to computers, Chromebooks, or mobile devices running Vernier Graphical Analysis®

Data Sharing from a LabQuest 3 can also be used to connect wired LabQuest sensors to mobile devices that don't support a USB interface.

### USB Sensor Interface

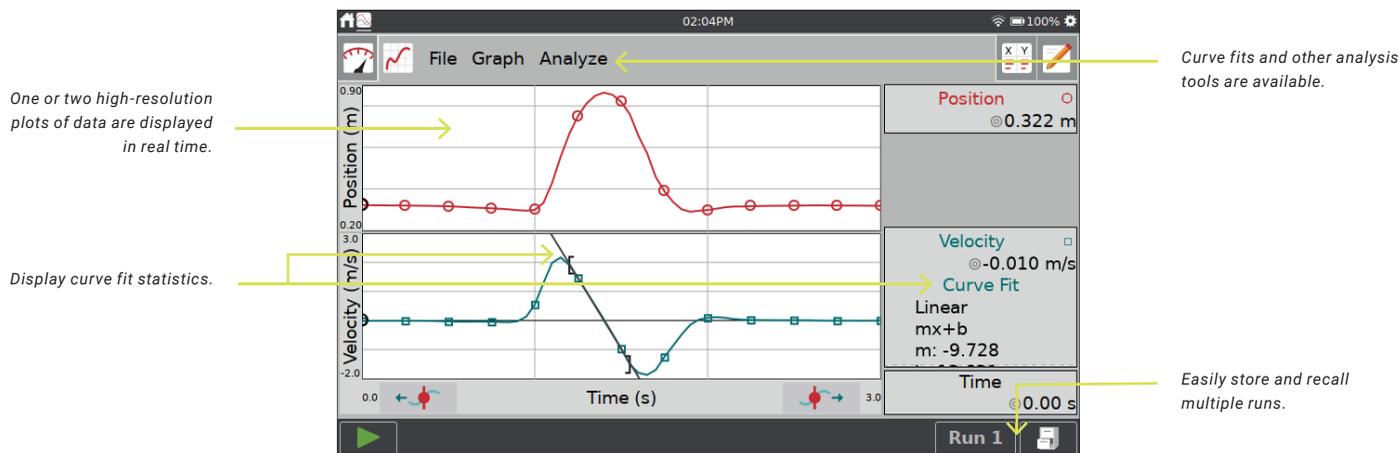
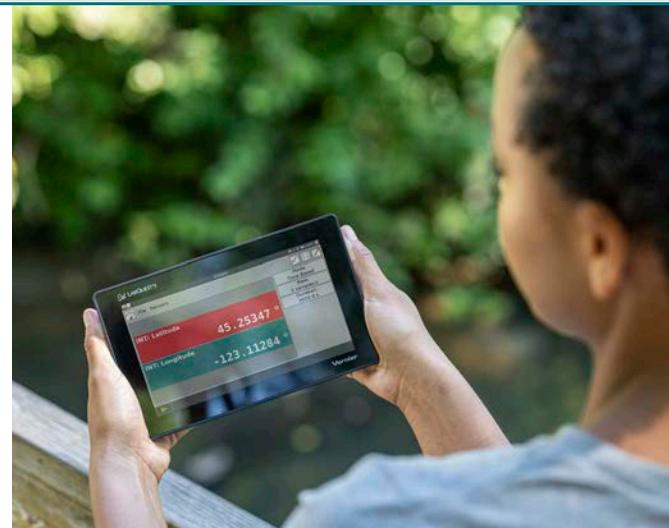
If you want to use your own computer or Chromebook to collect data, use LabQuest 3 as a conduit between our wired LabQuest sensors and your device. LabQuest 3 works as a USB sensor interface with Vernier Graphical Analysis.

Learn more at [vernier.com/labq3](http://vernier.com/labq3)

## LabQuest App

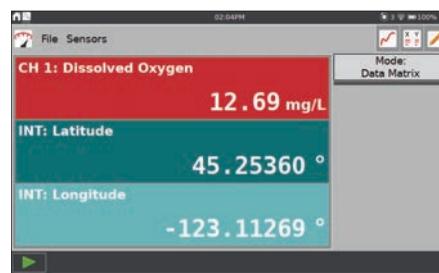
LabQuest 3 has built-in software that gives your students real-time graphing capabilities in a handheld device. It's powerful, yet beautifully simple.

- Collect data and view in a Data Table, Meter, and Graph.
  - Perform curve fits.
  - Use built-in sensors—GPS and Microphone.
  - Draw a prediction before collecting data.
  - Display two graphs at once.
- Display a tangent line or use the Integral function tool.
  - Calculate statistics for your data.
- Learn more about built-in applications and other great features at [vernier.com/labq3](http://vernier.com/labq3)

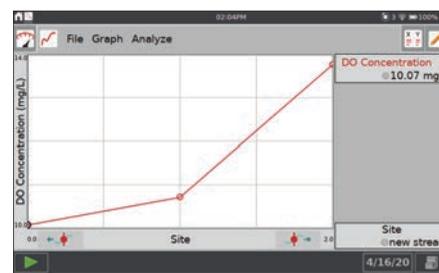


## One-Touch Simplicity

Your students can collect data and view them in a Meter, Graph, or Data Table.



Meter



Graph

4/16/20				
Site	Latitude (°)	Longitude (°)	Altitude (m)	DO Conc (mg/L)
1 new stream	45.50782	-122.85773	66	10.07
2 pond	45.50790	-122.85690	61	10.71
3 entrance	45.50841	-122.85613	51	13.77
4				
5				

Data Table

Learn more at [vernier.com/labq3](http://vernier.com/labq3)

# LabQuest 3 Accessories and Replacement Parts

Product	Order Code	Price
LabQuest Charge Station	LQ3-CRG	\$149
LabQuest 3 Stand	LQ3-STN	\$5
LabQuest Power Supply*	LQ3-PS	\$11
LabQuest Lanyard	LQ3-LAN	\$9
LabQuest 3 Battery*	LQ3-BAT	\$34
LabQuest Battery Boost 3	LQ-B00ST3	\$119
Vernier Micro USB Cable*	CB-USB-MICRO	\$5
Vernier Micro USB to USB-C Cable	CB-USB-C-MICRO	\$9

\*Included with LabQuest 3

# LabQuest Viewer App



## LabQuest Viewer

Teach students how to use LabQuest® by projecting your LabQuest screen. Display live images of all LabQuest units in your lab to monitor student progress or compare group data. LabQuest Viewer® is compatible with both macOS® and Windows® computers.

Computer software includes a site license for every teacher's computer in your school.

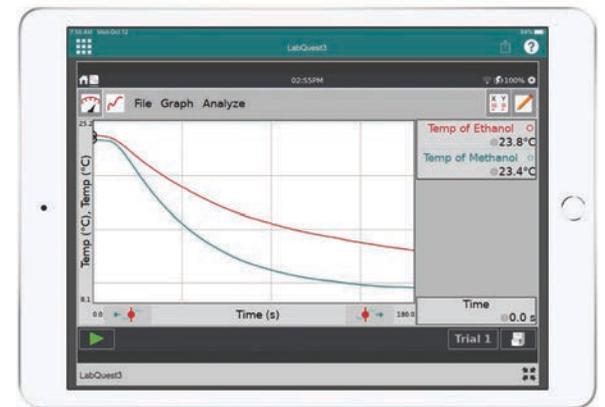
**CD** LQ-VIEW \$79  
**Download** LQ-VIEW-E \$79

For more information, visit [vernier.com/lq-view](http://vernier.com/lq-view)

## LabQuest Viewer for iPad

Use LabQuest Viewer app for iPad® on your classroom iPad to wirelessly view and control LabQuest. When your iPad is used with a projector, you can easily display any LabQuest screen for the entire class to see.

For more information, visit [vernier.com/lq-view-ipad](http://vernier.com/lq-view-ipad)



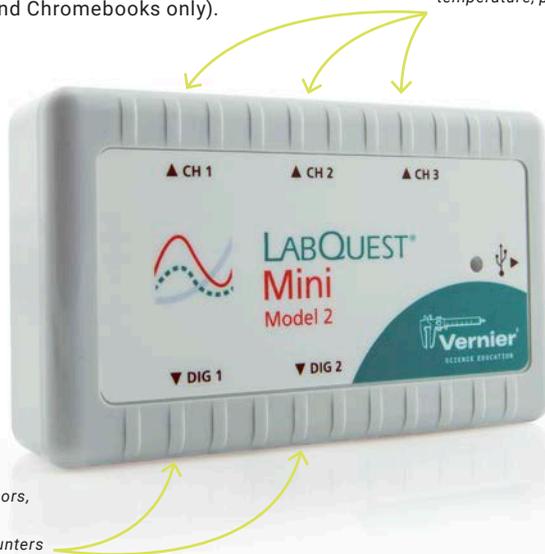


## LabQuest Mini

LabQuest Mini (Model 2) brings the power of our award-winning LabQuest technology to you when you don't need the versatility of a standalone device. The perfect solution for educators collecting data using LabQuest sensors with a computer or Chromebook,<sup>™</sup> LabQuest Mini interfaces with Vernier Graphical Analysis<sup>®</sup> (computers and Chromebooks only).

LQ-MINI \$189

[Learn more at vernier.com/lq-mini](http://vernier.com/lq-mini)



*Three analog sensor ports for use with most sensors, such as temperature, pH, and force*

*Two digital sensor ports for use with digital sensors, such as motion detectors, photogates, chemical polarimeters, diffraction apparatus, and drop counters*

**USB connectivity**

*Connect LabQuest Mini to a Windows or macOS computer or a Chromebook to collect data.*

## Go!Link

The Go!Link USB sensor interface is a quick and affordable way to get started with data-collection technology. It's a single-channel interface that connects most of our LabQuest sensors to your computer or Chromebook USB port.

GO-LINK \$75

[Learn more at vernier.com/go-link](http://vernier.com/go-link)



**USB connectivity**

*Connect Go!Link to a Windows or macOS computer or a Chromebook to collect data.*

**One analog port for use with most sensors, such as temperature, pH, and force**

### USING GO DIRECT SENSORS? NO INTERFACE REQUIRED!

LabQuest Mini and Go!Link interfaces are required when using wired LabQuest Sensors. They are not for use with Go Direct<sup>®</sup> Sensors.

# High School

Encourage your students and build their confidence in pursuing a STEM career paths with hands-on experience using data-collection technology from Vernier. Our technology supports you as you prepare students to meet the NGSS and state standards through experiments that support three-dimensional learning.

[vernier.com/high-school](https://www.vernier.com/high-school)



## Contents

17 **Lab Books & Investigations**

### Subjects

18 **Biology**

24 **Environmental Science**

30 **Earth Science**

34 **Chemistry**

40 **Physical Science**

42 **Physics**

58 **Engineering and Coding**

60 **Math**

For college products, visit [vernier.com/college](https://www.vernier.com/college)

## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](https://www.vernier.com/training)

# Lab Books & Investigations



## E-books and Printed Books—the Choice is Yours

Many of our popular, award-winning lab books are available in both e-version and printed formats. When you purchase a printed book, you also receive the electronic version. When you purchase either format, you receive

- Anytime access to the most up-to-date versions of experiments on all supported Vernier software (free Vernier web account required)
- Editable student files and complete teacher information files, including sample data and supplies lists
- A generous site license—purchase once and share files with other teachers in your school

## Helping You Meet Standards and Learning Objectives

Vernier understands that helping students meet standards is an important part of teaching. As standards change, we are committed to providing you with the most current information. You will find the following alignments and correlations for Vernier lab books at [vernier.com/standards](https://www.vernier.com/standards)

- NGSS (Next Generation Science Standards)
- CSTA (Computer Science Teachers Association)
- AP\* (Advanced Placement Program)
- IB† (International Baccalaureate Diploma Program)

## Ideas for Your Science Classroom

If you are looking for experiments that can help you excite your students about STEM, check out our extensive library. We make it easy to find ideas from fellow educators and Vernier professionals.

Visit [vernier.com/experiment](https://www.vernier.com/experiment)

## NGSS Aligned

To learn about the Next Generation Science Standards and Vernier, visit [vernier.com/ngss](https://www.vernier.com/ngss)

Learn more at [vernier.com/lab-books](https://www.vernier.com/lab-books)

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† The IB Diploma Program is an official program of the International Baccalaureate Organization (IBO) which authorizes schools to offer it. The material available here has been developed independently of the IBO and is not endorsed by it.

HIGH SCHOOL

# Biology

Our biology solutions include high-quality sensors, easy-to-use software, and exceptional technical support to set up you and your students for classroom success.

[vernier.com/biology](https://www.vernier.com/biology)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](https://www.vernier.com/training)

## Go Direct CO<sub>2</sub> Gas

MOST POPULAR

Use Go Direct® CO<sub>2</sub> Gas to measure carbon dioxide gas levels, air temperature, and relative humidity. It's an excellent sensor for measuring fermentation, cell respiration, and photosynthesis.

GDX-CO2 \$225

[vernier.com/gdx-co2](https://www.vernier.com/gdx-co2)



## Go Direct O<sub>2</sub> Gas

Use this sensor to measure gaseous oxygen concentration levels and air temperature.

GDX-O2 \$209

[vernier.com/gdx-o2](https://www.vernier.com/gdx-o2)



## Go Direct Gas Pressure

Use Go Direct Gas Pressure to monitor gas pressure in a variety of experiments. Easily change the displayed units to any one of seven options. This sensor includes a syringe, tubing, and stoppers to ease experiment setup.

GDX-GP \$99

[vernier.com/gdx-gp](http://vernier.com/gdx-gp)



## Go Direct pH

This is an important and versatile sensor for lab and field activities alike. Go Direct pH is a general-purpose pH sensor used to monitor pH of aqueous solutions.

GDX-PH \$109

[vernier.com/gdx-ph](http://vernier.com/gdx-ph)



## Go Direct Optical Dissolved Oxygen

Use this sensor to measure dissolved oxygen, water temperature, and atmospheric pressure.

GDX-ODO \$369

[vernier.com/gdx-odo](http://vernier.com/gdx-odo)



## Go Direct Conductivity

Go Direct Conductivity determines the ionic content of an aqueous solution by measuring its electrical conductivity. It features a built-in temperature sensor, so you can simultaneously read conductivity and temperature.

GDX-CON \$129

[vernier.com/gdx-con](http://vernier.com/gdx-con)



## Go Direct Respiration Belt

Go Direct Respiration Belt uses a force sensor and an adjustable nylon strap to measure human respiration rates before, during, and after exercise.

GDX-RB \$119

[vernier.com/gdx-rb](http://vernier.com/gdx-rb)



## Go Direct EKG

Go Direct EKG measures electrical activity in the heart and electrical signals produced during muscle contractions.

GDX-EKG \$169

[vernier.com/gdx-ekg](http://vernier.com/gdx-ekg)



## Human Physiology Go Direct Standard Package

This package includes nine sensors that work with Vernier Graphical Analysis® Pro and LabQuest® 3.

Two useful accessories are also included.

- Go Direct® Blood Pressure
- Go Direct EKG
- Go Direct Force and Acceleration
- Go Direct Hand Dynamometer
- Go Direct O<sub>2</sub> Gas
- Go Direct Respiration Belt
- Go Direct Surface Temperature
- Go Direct Spirometer
- Go Wireless® Heart Rate
- Reflex Hammer Accessory Kit
- BioChamber 250

GDP-HP-DX  \$1,324

Buy 8 or more packages at \$1,284 and save \$320.

[vernier.com/gdp-hp-dx](http://vernier.com/gdp-hp-dx)

## Human Physiology Experiments: Volume 2

*Human Physiology Experiments: Volume 2* contains 15 experiments designed to encourage students to explore the physiology of various human organ systems. An expansion of our *Human Physiology Experiments: Volume 1* lab book, the setup for these experiments is minimal—students are collecting data within minutes.

**Printed book + download** ALB-HP2 \$41

**Download only** ALB-HP2-E \$33

[vernier.com/alb-hp2](http://vernier.com/alb-hp2)

**DOWNLOAD** a free experiment at [vernier.com/alb-hp2](http://vernier.com/alb-hp2)



## Go Direct Hand Dynamometer

Measure grip strength, pinch strength, and muscle fatigue wirelessly.

GDX-HD \$129

[vernier.com/gdx-hd](http://vernier.com/gdx-hd)



**NEW**

## Go Direct PAR

Go Direct PAR (Photosynthetically Active Radiation) measures photosynthetic light levels in both air and water.

GDX-PAR \$299

[vernier.com/gdx-par](http://vernier.com/gdx-par)



**NEW**

## Go Direct Soil Moisture

Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent.

GDX-SM \$149

[vernier.com/gdx-sm](http://vernier.com/gdx-sm)



## Go Direct Weather System

Easily monitor a wide variety of environmental factors with just one sensor. The included Go Direct Weather Vane accessory is required to report wind direction.

GDX-WTVA \$158

[vernier.com/gdx-wtva](http://vernier.com/gdx-wtva)



## LabQuest 3

LabQuest 3 can serve as a standalone data-collection platform that works with all of our sensors. This makes it an excellent choice for teachers and students in the classroom and in the field.

LABQ3 \$399

[vernier.com/labq3](http://vernier.com/labq3)

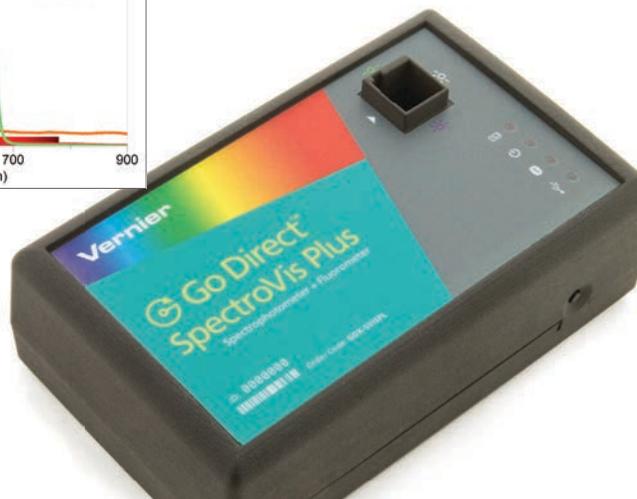
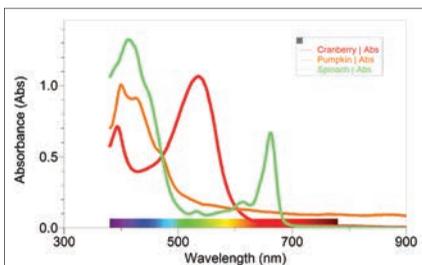


## Go Direct SpectroVis Plus

Introduce your students to spectroscopy with our affordable Go Direct SpectroVis® Plus. Students can easily collect a full-wavelength spectrum (absorbance, percent transmittance, fluorescence, or intensity), study absorbance vs. concentration (standard curve), or monitor enzyme activity (kinetics). Collect and analyze data using Vernier Spectral Analysis® app or LabQuest App.

GDX-SVISPL \$459

[vernier.com/gdx-svispl](http://vernier.com/gdx-svispl)



⚡ For California Proposition 65 warning, see pp. 78–79.

## Biology Go Direct Starter Package

This package includes four sensors that work with Vernier Graphical Analysis Pro and LabQuest 3.

- Go Direct Temperature
- Go Wireless Heart Rate
- Go Direct Gas Pressure
- Go Direct CO<sub>2</sub> Gas

GDP-BIO-ST \$500

[Learn more at vernier.com/gdp-bio-st](http://vernier.com/gdp-bio-st)



## Biology Go Direct Standard Package

This package includes 11 sensors that work with Vernier Graphical Analysis Pro and LabQuest 3. Two sampling chambers are also included.

- Go Direct Temperature
- Go Direct Gas Pressure
- Go Direct O<sub>2</sub> Gas
- Go Direct CO<sub>2</sub> Gas
- Go Direct Colorimeter
- Go Direct Conductivity
- Go Direct EKG
- Go Direct pH
- Go Direct Optical Dissolved Oxygen
- Go Direct Respiration Belt
- Go Wireless® Heart Rate
- BioChamber 250 ⚡
- BioChamber 2000 ⚡

GDP-BIO-ODX ⚡ \$1,764

Buy 8 or more packages at \$1,711 and save \$424.

[Learn more at vernier.com/gdp-bio-odx](http://vernier.com/gdp-bio-odx)

## Biology with Vernier Lab Book

*Biology with Vernier* addresses the fundamentals of a high school biology course with 31 experiments that include cell respiration, photosynthesis, membrane diffusion, osmosis, human physiology, transpiration, fermentation, and more.



[Learn more at vernier.com/bwv](http://vernier.com/bwv)

Printed book + download BWV \$52

Download only BWV-E \$44

# Featured Products

## Go Direct Sensors

Sensor		Order Code	Price
Go Direct® Blood Pressure		GDX-BP	\$125
Go Direct CO <sub>2</sub> Gas		GDX-CO2	\$225
Go Direct Colorimeter		GDX-COL	\$129
Go Direct Conductivity		GDX-CON	\$129
Go Direct EKG		GDX-EKG	\$169
Go Direct Ethanol Vapor		GDX-ETOH	\$169
Go Direct Force and Acceleration (for use with Reflex Hammer Accessory Kit)		GDX-FOR	\$119
Go Direct Gas Pressure		GDX-GP	\$99
Go Direct Hand Dynamometer		GDX-HD	\$129
Heart Rate Monitors			
Go Wireless® Exercise Heart Rate		GW-EHR	\$79
Go Wireless Heart Rate		GW-HR	\$98
Go Direct O <sub>2</sub> Gas		GDX-O2	\$209
Go Direct Optical Dissolved Oxygen		GDX-ODO	\$369

**NEW** Go Direct PAR



GDX-PAR

\$299

pH Sensors

Go Direct pH



GDX-PH

\$109

Go Direct Tris-Compatible Flat pH



GDX-FPH

\$134

Go Direct Respiration Belt



GDX-RB

\$119

**NEW** Go Direct Soil Moisture



GDX-SM

\$149

Go Direct SpectroVis® Plus



GDX-SVISPL

\$459

Go Direct Spirometer



GDX-SPR

\$219

Temperature Probes

Go Direct Surface Temperature



GDX-ST

\$99

Go Direct Temperature



GDX-TMP

\$78

Go Direct Weather System



GDX-WTVA

\$158

## Accessories

Accessory	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89
Reflex Hammer Accessory Kit	RFX-ACC	\$29

See all our products for biology at [vernier.com/biology](https://www.vernier.com/biology)

## LabQuest Sensors

Sensor	Order Code	Price
25-g Accelerometer	ACC-BTA	\$110
Blood Pressure Sensor	BPS-BTA	\$120
CO <sub>2</sub> Gas Sensor	C02-BTA	\$299
Colorimeter	COL-BTA	\$128
Conductivity Probe	CON-BTA	\$125
EKG Sensor	EKG-BTA	\$179
Ethanol Sensor	ETH-BTA	\$135
Gas Pressure Sensor	GPS-BTA	\$94
Goniometer	GNM-BTA ⚡	\$189
Hand Dynamometer	HD-BTA	\$124
Heart Rate Monitors		
Exercise Heart Rate Monitor	EHR-BTA	\$99
Hand-Grip Heart Rate Monitor	HGH-BTA	\$129
O <sub>2</sub> Gas Sensor	O2-BTA	\$210
PAR Sensor	PAR-BTA	\$259
pH Sensors		
pH Sensor	PH-BTA	\$99
Tris-Compatible Flat pH Sensor	FPH-BTA	\$124
Soil Moisture Sensor	SMS-BTA	\$139
Spirometer	SPR-BTA	\$240
Temperature Probes		
Stainless Steel Temperature Probe	TMP-BTA	\$43
Surface Temperature Sensor	STS-BTA	\$34

See all our products for biology at [vernier.com/biology](https://www.vernier.com/biology)

## Spectrophotometers

[vernier.com/spectrometers](https://www.vernier.com/spectrometers)

Equipment	Order Code	Price
Go Direct SpectroVis Plus	GDX-SVISPL	\$459
Go Direct Fluorescence/UV-VIS Spectrophotometer	GDX-SPEC-FUV	\$2,999
Go Direct UV-VIS Spectrophotometer	GDX-SPEC-UV	\$2,499
Go Direct Visible Spectrophotometer	GDX-SPEC-VIS	\$1,899

## Digital Microscopes

Equipment	Order Code	Price
Celestron® Digital Microscope Imager	CS-DMI ⚡ <a href="https://www.vernier.com/cs-dmi">vernier.com/cs-dmi</a>	
5MP Celestron Digital Microscope	CS-5MP ⚡ <a href="https://www.vernier.com/cs-5mp">vernier.com/cs-5mp</a>	
USB Digital Microscope	BD-EDU-100	\$119

## Lab Books\*

Title	Order Code	Price
<i>Biology with Vernier</i>	BWV	\$52
<i>Investigating Biology through Inquiry</i>	BIO-I	\$52
<i>Advanced Biology with Vernier</i> (LabQuest® sensors only)	BIO-A	\$52
<i>Human Physiology Experiments: Volume 1</i> (Go Direct sensors only)	HSB-HP	\$41
<i>Human Physiology Experiments: Volume 2</i> (Go Direct sensors only)	ALB-HP2	\$41
<i>Human Physiology with Vernier</i> (LabQuest sensors only)	HP-A	\$52
<i>Agricultural Science with Vernier</i>	AWV	\$52

\* Includes printed book and download; also available as a download only.

## Looking for Replacement Parts?

Visit [vernier.com/replacements](https://www.vernier.com/replacements)

HIGH SCHOOL

# Environmental Science

Help your students see that the environmental science concepts discussed in the classroom have serious implications on the world around them. Our hands-on investigations and data-collection technology help students form a better understanding of phenomena.

[vernier.com/environmental-science](http://vernier.com/environmental-science)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

**NEW**

## Go Direct Soil Moisture

This sensor uses capacitance to measure the volumetric water content of soil.

GDX-SM \$149

[vernier.com/gdx-sm](http://vernier.com/gdx-sm)



## Go Direct Optical Dissolved Oxygen

This optical sensor makes it easy to measure dissolved oxygen in water, atmospheric pressure, and water temperature.

GDX-ODO \$369

[vernier.com/gdx-odo](http://vernier.com/gdx-odo)



**NEW**

## Go Direct Salinity

Go Direct® Salinity precisely measures the total dissolved salt content of ocean or brackish water.

GDX-SAL \$180

[vernier.com/gdx-sal](http://vernier.com/gdx-sal)



## Go Direct Tris-Compatible Flat pH

The flat glass, double-junction design makes this sensor a good choice for environmental science.

GDX-FPH \$134

[vernier.com/gdx-fph](http://vernier.com/gdx-fph)



## Go Direct Conductivity

Go Direct Conductivity determines the ionic content of an aqueous solution by measuring its electrical conductivity.

GDX-CON \$129

[vernier.com/gdx-con](http://vernier.com/gdx-con)



## Go Direct Surface Temperature

This sensor has an exposed thermistor that results in an extremely rapid response time, making it perfect for use in air and water.

GDX-ST \$99

[vernier.com/gdx-st](http://vernier.com/gdx-st)



## Go Direct Light and Color

Measure light intensity in the visible-to-ultraviolet electromagnetic spectrum. An RGB color sensor detects relative contributions of primary colors in light.

GDX-LC \$99

[vernier.com/gdx-lc](http://vernier.com/gdx-lc)



## Go Direct Weather System

Easily monitor a wide variety of environmental factors with just one sensor. Go Direct Weather System includes an affordable, wireless handheld sensor used to measure ambient temperature, humidity, wind speed, and more. The included Go Direct Weather Vane accessory is required to report wind direction.

GDX-WTVA (sensor and vane) \$158

[vernier.com/gdx-wtva](http://vernier.com/gdx-wtva)



## Strengthen students' critical thinking skills by introducing them to alternative energy solutions to real-world problems.

The KidWind Project and Vernier have teamed up to provide the technology, resources, and support you need for your students to investigate renewable energy.

- **Engage your students** as they watch power output and energy production data develop in real time.
- **Inspire creativity** as your students build and test prototypes, test solutions to engineering problems, and optimize designs.
- **Measure** voltage and current, and calculate power, without using a multimeter.
- **Set up activities quickly** and easily, creating more time for instruction and exploration.



## KidWind Advanced Wind Experiment Kit

Discover advanced concepts of wind turbine technology, including gearboxes and generator construction (with the optional KidWind simpleGEN). Students use the blades they design to generate electricity, lift weights, and pump water. This kit is recommended for use with our *Renewable Energy with Vernier* lab book.

KW-AWX \$174

### KidWind Advanced Wind Experiment Kit Classroom Pack

KW-AWXC \$444

[vernier.com/kw-awx](http://vernier.com/kw-awx)



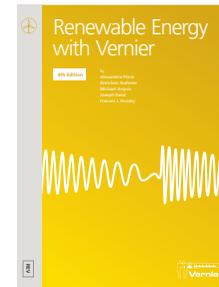
## Renewable Energy with Vernier

The *Renewable Energy with Vernier* lab book features 26 experiments in wind and solar energy. The book contains a combination of explorations, classic experiments, inquiry investigations, engineering projects, and more.

[vernier.com/rev](http://vernier.com/rev)

**Printed book + download**  
REV \$52

**Download only**  
REV-E \$44



## Solar Energy Exploration Kit

Explore solar energy with this innovative science kit designed to help students investigate energy transformations. Experiment with basic circuits and learn about important factors in photovoltaic systems.

KW-SEEK \$89

[vernier.com/kw-seek](http://vernier.com/kw-seek)



## KidWind Blade Design Consumables

Bulk balsa, chipboard sheets, and dowels for blade making in the classroom. Pack includes 100 balsa sheets, 150 chipboard sheets, and 250 dowels.

KW-BDC \$169

[vernier.com/kw-bdc](http://vernier.com/kw-bdc)



## Go Direct Energy

This sensor quantifies the voltage, current, power, and energy output of small wind turbines and solar panels, such as those used in our KidWind Experiment Kits.

GDX-NRG \$98

[vernier.com/gdx-nrg](http://vernier.com/gdx-nrg)



## LabQuest 3

LabQuest 3 is a powerful, connected, and remarkably versatile data-logging solution.

LabQuest® 3 can serve as a standalone data-collection platform that works with all of our sensors. This makes it an excellent choice for teachers and students in the classroom as well as in the field.

LABQ3 \$399

[vernier.com/labq3](http://vernier.com/labq3)



## Go Direct Sensor Clamp

The Go Direct® Sensor Clamp securely fastens to a wand-style Go Direct sensor, and the included lanyard works as a strap to prevent accidental drops during investigations in the field. Sensors are sold separately.

GDX-CLAMP \$14

[vernier.com/gdx-clamp](http://vernier.com/gdx-clamp)



## Environmental Science Go Direct Starter Package

This package includes four sensors that work with Vernier Graphical Analysis® Pro and LabQuest 3.

- Go Direct Temperature
- Go Direct Tris-Compatible Flat pH
- Go Direct Conductivity
- Go Direct Optical Dissolved Oxygen

GDP-EV-ST \$710

Learn more at [vernier.com/gdp-ev-st](http://vernier.com/gdp-ev-st)



## Investigating Environmental Science through Inquiry

The *Investigating Environmental Science through Inquiry* lab book contains 34 inquiry-based environmental science investigations.

Topics include

- Earth systems and resources (air, water, and soil)
- The living world
- Global change and population
- Energy resources and consumption
- Pollution

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## Water Quality with Vernier

The *Water Quality with Vernier* lab book contains 18 water quality tests, including pH, total dissolved solids, dissolved oxygen, BOD, flow rate, turbidity, nitrates, and phosphates.

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Printed book + download WQV \$52  
Download only WQV-E \$44

# Featured Products

## Go Direct Sensors

Sensor		Order Code	Price
Go Direct® CO <sub>2</sub> Gas		GDX-CO2	\$225
Go Direct Colorimeter		GDX-COL	\$129
Go Direct Conductivity		GDX-CON	\$129
Go Direct Current		GDX-CUR	\$99
Go Direct Energy		GDX-NRG	\$98
Go Direct Ethanol Vapor		GDX-ETOH	\$169
Ion-Selective Electrodes			
Go Direct Ammonium Ion-Selective Electrode		GDX-NH4	\$289
Go Direct Calcium Ion-Selective Electrode		GDX-CA	\$289
Go Direct Chloride Ion-Selective Electrode		GDX-CL	\$289
Go Direct Nitrate Ion-Selective Electrode		GDX-NO3	\$289
Go Direct Light and Color		GDX-LC	\$99

Go Direct O <sub>2</sub> Gas		GDX-O2	\$209
Go Direct Optical Dissolved Oxygen		GDX-ODO	\$369
pH Sensors			
Go Direct pH		GDX-PH	\$109
Go Direct Tris-Compatible Flat pH		GDX-FPH	\$134
<b>NEW</b> Go Direct Salinity		GDX-SAL	\$180
<b>NEW</b> Go Direct Soil Moisture		GDX-SM	\$149
Go Direct SpectroVis® Plus		GDX-SVISPL	\$459
Temperature Probes			
Go Direct Surface Temperature		GDX-ST	\$99
Go Direct Temperature		GDX-TMP	\$78
Go Direct Voltage		GDX-VOLT	\$89
Go Direct Weather System		GDX-WTVA	\$158

See all our products for environmental science at [vernier.com/environmental-science](https://www.vernier.com/environmental-science)

## Go Direct Accessories

Accessory		Order Code	Price
Go Direct Charge Station		GDX-CRG	\$89
Go Direct Sensor Clamp		GDX-CLAMP	\$14

## LabQuest Sensors

Sensor		Order Code	Price
Conductivity Probe		CON-BTA	\$125
Flow Rate Sensor		FLO-BTA	\$139
pH Sensor		PH-BTA	\$99
Tris-Compatible Flat pH		FPH-BTA	\$124
Salinity Sensor		SAL-BTA	\$149
Soil Moisture Sensor		SMS-BTA	\$139
Turbidity Sensor		TRB-BTA	\$124

## Davis Instruments

Available Products	Order Code	More Info
Davis Vantage Vue® Wireless Weather Station (with console)	DW-VV	<a href="http://vernier.com/dw-vv">vernier.com/dw-vv</a>

Davis Vantage Pro2™ Wireless Weather Station	DW-VP2	<a href="http://vernier.com/dw-vp2">vernier.com/dw-vp2</a>
Davis Vantage Pro2 Plus Wireless Weather Station	DW-VP2PLUS	<a href="http://vernier.com/dw-vp2plus">vernier.com/dw-vp2plus</a>
Davis AirLink® Air Quality Monitor	DW-AIRLINK	<a href="http://vernier.com/dw-airlink">vernier.com/dw-airlink</a>

## Lab Equipment

Equipment	Order Code	Price
KidWind Advanced Wind Experimenty Kit	KW-AWX	\$174
KidWind Basic Wind Experiment Kit	KW-BWX	\$134
Solar Energy Exploration Kit	KW-SEEK	\$89
KidWind 2V/400mA Solar Panel	KW-SP2V	\$21
Vernier Variable Load	VES-VL	\$74
Primary Productivity Kit	PPK	\$49
Water Depth Sampler	WDS	\$114
Water Quality Bottles	WQ-BOT	\$28

## Lab Books

Book Title	Order Code	Price
<i>Investigating Environmental Science through Inquiry</i>	Printed book + download: ESI	\$52
	Download only: ESI-E	\$44
<i>Water Quality with Vernier (LabQuest® sensors only)</i>	Printed book + download: WQV	\$52
	Download only: WQV-E	\$44
<i>Renewable Energy with Vernier</i>	Printed book + download: REV	\$52
	Download only: REV-E	\$44
<i>Climate and Meteorology Experiments (Go Direct sensors only)</i>	Download only: HSB-CM-E	\$22

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See all our products for environmental science at [vernier.com/environmental-science](http://vernier.com/environmental-science)

HIGH SCHOOL

# Earth Science

When you use Vernier technology to teach Earth science, you can count on our affordable sensors, intuitive software, and creative solutions to help your students understand key Earth science concepts.

[vernier.com/earth-science](https://www.vernier.com/earth-science)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](https://www.vernier.com/training)

## Go Direct Temperature

MOST POPULAR

This rugged probe measures the temperature of a variety of substances including air, soil, and water.

Range:  $-40$  to  $125^{\circ}\text{C}$

GDX-TMP \$78

[vernier.com/gdx-tmp](https://www.vernier.com/gdx-tmp)



## Go Direct Temperature Teacher Pack

GDX-TMP-TP \$692

Includes 8 Go Direct® Temperature Probes and a Go Direct Charge Station.



## Go Direct 3-Axis Magnetic Field

Useful for topics in geology, this sensor can determine the magnitude and direction of a magnetic field at any point in space.

GDX-3MG \$89

[vernier.com/gdx-3mg](https://www.vernier.com/gdx-3mg)



## Go Direct pH

This wireless sensor monitors the pH of aqueous solutions and is perfect for lab and field experiments alike.

GDX-PH \$109

[vernier.com/gdx-ph](http://vernier.com/gdx-ph)



## Go Direct pH Teacher Pack

GDX-PH-TP \$933

Save money when you purchase the Go Direct pH Teacher Pack, which includes 8 Go Direct pH Sensors and a Go Direct Charge Station.



## Go Direct Conductivity

Go Direct Conductivity determines the ionic content of an aqueous solution by measuring its electrical conductivity.

GDX-CON \$129

[vernier.com/gdx-con](http://vernier.com/gdx-con)



## Go Direct Light and Color

Measure light intensity in the visible-to-ultraviolet electromagnetic spectrum. An RGB color sensor detects relative contributions of primary colors in light.

GDX-LC \$99

[vernier.com/gdx-lc](http://vernier.com/gdx-lc)



## Go Direct Motion

Go Direct Motion uses ultrasound to measure the position, velocity, and acceleration of moving objects.

GDX-MD \$124

[vernier.com/gdx-md](http://vernier.com/gdx-md)



## Climate and Meteorology Experiments Go Direct Package

This package includes all the sensors needed to do the activities in the book.

- Go Direct® Surface Temperature (2)
- Go Direct Light and Color
- Go Direct Weather System

GDP-CM \$455

Buy 8 or more packages at \$441 and save \$112.

Learn more at [vernier.com/gdp-cm](http://vernier.com/gdp-cm)



## Go Direct Weather System

Easily monitor a wide variety of environmental factors with just one sensor. Go Direct Weather System includes an affordable, wireless handheld sensor used to measure ambient temperature, humidity, wind speed, and more. The included Go Direct Weather Vane accessory is required to report wind direction.

GDX-WTVA (sensor and vane) \$158

Learn more at [vernier.com/gdx-wtva](http://vernier.com/gdx-wtva)



## Climate and Meteorology Experiments

This lab book is packed with interactive experiments that challenge students to use data-collection technology to explore storm systems and other important weather-related topics.

Learn more at [vernier.com/hsb-cm-e](http://vernier.com/hsb-cm-e)



Download only HSB-CM-E \$22

## Go Direct Surface Temperature

This sensor has an exposed thermistor that results in an extremely rapid response time, making it perfect for use in air and water.

GDX-ST \$99

Learn more at [vernier.com/gdx-st](http://vernier.com/gdx-st)



## Earth Science with Vernier

In addition to the 33 experiments in *Earth Science with Vernier*, the six projects in this lab book engage students as they learn about the world around them.

Learn more at [vernier.com/esv](http://vernier.com/esv)



Printed book + download ESV \$52

Download only ESV-E \$44

# Featured Products

## Go Direct Sensors

Sensor	Order Code	Price
Go Direct 3-Axis Magnetic Field	GDX-3MG	\$89
Go Direct CO <sub>2</sub> Gas	GDX-CO2	\$225
Go Direct Conductivity	GDX-CON	\$129
Go Direct Current	GDX-CUR	\$99
Go Direct Energy	GDX-NRG	\$98
Go Direct Light and Color	GDX-LC	\$99
Go Direct Motion	GDX-MD	\$124
Go Direct O <sub>2</sub> Gas	GDX-O2	\$209
Go Direct Optical Dissolved Oxygen	GDX-ODO	\$369
pH Sensors		
Go Direct pH	GDX-PH	\$109
Go Direct Tris-Compatible Flat pH	GDX-FPH	\$134
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Voltage	GDX-VOLT	\$89
Go Direct Weather	GDX-WTHR	\$129
Go Direct Weather System	GDX-WTVA	\$158

## Go Direct Accessories

Accessory	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89
Go Direct Sensor Clamp	GDX-CLAMP	\$14

## Looking for Replacement Parts?

Visit [vernier.com/replacements](http://vernier.com/replacements)

## LabQuest Sensors

Sensor	Order Code	Price
Anemometer	ANM-BTA	\$109
Barometer	BAR-BTA	\$79
Flow Rate Sensor	FLO-BTA	\$139
Magnetic Field Sensor	MG-BTA	\$69
Salinity Sensor	SAL-BTA	\$149
Soil Moisture Sensor	SMS-BTA	\$139
Stainless Steel Temperature Probe	TMP-BTA	\$43
Tris-Compatible Flat pH Sensor	FPH-BTA	\$124
Turbidity Sensor	TRB-BTA	\$124

## Accessories & Lab Equipment

Product	Order Code	Price
Davis® Weather Stations	<a href="http://vernier.com/weather">vernier.com/weather</a>	
Electrode Support	ESUP	\$10
KidWind Basic Wind Experiment Kit	KW-BWX	\$134
Solar Energy Exploration Kit	KW-SEEK	\$89
KidWind 2V/400mA Solar Panel	KW-SP2V	\$21
Vernier Resistor Board	VES-RB	\$19

## Lab Books

Title	Order Code	Price
<i>Earth Science with Vernier</i>	Printed book + download: ESV	\$52
	Download only: ESV-E	\$44
<i>Water Quality with Vernier</i> (LabQuest® sensors only)	Printed book + download: WQV	\$52
	Download only: WQV-E	\$44
<i>Climate and Meteorology Experiments</i> (Go Direct sensors only)	Download only: HSB-CM-E	\$22

See all our products for Earth science at [vernier.com/earth-science](http://vernier.com/earth-science)

HIGH SCHOOL

# Chemistry

Vernier chemistry resources cover an array of key concepts to help prepare your students for what lies ahead. From gas laws to spectroscopy, our products are backed by an extensive collection of experiments and unparalleled technical support.

[vernier.com/chemistry](http://vernier.com/chemistry)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## Go Direct Temperature

MOST POPULAR

Students can use this rugged, general-purpose sensor to monitor temperature.

Range:  $-40$  to  $125^{\circ}\text{C}$

GDX-TMP \$78

[vernier.com/gdx-tmp](http://vernier.com/gdx-tmp)



## Go Direct Temperature Teacher Pack

GDX-TMP-TP \$692

Includes 8 Go Direct<sup>®</sup> Temperature Probes and a Go Direct Charge Station.



## Go Direct pH

Conduct acid-base titrations, monitor pH changes during chemical reactions, and investigate household acids and bases. The wireless connection makes it easier to do field-based studies such as testing the pH of surface water.

GDX-PH \$109

[vernier.com/gdx-ph](http://vernier.com/gdx-ph)



## Go Direct pH Teacher Pack

GDX-PH-TP \$933

Save money when you purchase the Go Direct pH Teacher Pack, which includes 8 Go Direct pH Sensors and a Go Direct Charge Station.



## Go Direct Gas Pressure

Explore pressure changes and gas laws with this sensor that measures the absolute pressure of a gas.

GDX-GP \$99

[vernier.com/gdx-gp](http://vernier.com/gdx-gp)



## Go Direct Conductivity

Go Direct Conductivity determines the ionic content of an aqueous solution by measuring its electrical conductivity. It features a built-in temperature sensor to simultaneously read conductivity and temperature.

GDX-CON \$129

[vernier.com/gdx-con](http://vernier.com/gdx-con)



## Go Direct Colorimeter

Explore absorbance and percent transmittance in a variety of experiments including Beer's law (absorbance vs. concentration) and kinetic studies (concentration vs. time). Students select between four wavelengths (430 nm, 470 nm, 565 nm, 635 nm) to set up their experiment.

GDX-COL \$129

[vernier.com/gdx-col](http://vernier.com/gdx-col)



## Go Direct Drop Counter

As an alternative to using a buret, the drop counter precisely records the number of drops of titrant added during a titration and then automatically converts it to volume.

GDX-DC \$109

[vernier.com/gdx-dc](http://vernier.com/gdx-dc)



## Go Direct ORP

Determine the equivalence point of an oxidation-reduction titration or the oxidizing ability of chlorine in swimming pools. This sensor measures the capacity of a solution to either release or accept electrons from chemical reactions.

GDX-ORP \$119

[vernier.com/gdx-orp](http://vernier.com/gdx-orp)



## Go Direct Constant Current System

Determine Avogadro's number and perform various electroplating and electrolysis experiments. This system combines a DC power source with a built-in current sensor to eliminate the need for a separate power supply. It can deliver up to 0.6 A at 5 V DC.

GDX-CCS \$95

[vernier.com/gdx-ccs](http://vernier.com/gdx-ccs)



## Go Direct Wide-Range Temperature

Use Go Direct® Wide-Range Temperature to determine the melting point of caffeine or the boiling point of different vegetable oils.

Range: -20 to 330°C

GDX-WRT \$139

[vernier.com/gdx-wrt](http://vernier.com/gdx-wrt)



## Go Direct Melt Station

Teach students the visual detection capillary method of melting point determination with Go Direct Melt Station. It accurately measures melting temperatures of a solid (up to 260°C), and real-time graphing provides a unique perspective of the melting process.

GDX-MLT \$599

[vernier.com/gdx-mlt](http://vernier.com/gdx-mlt)



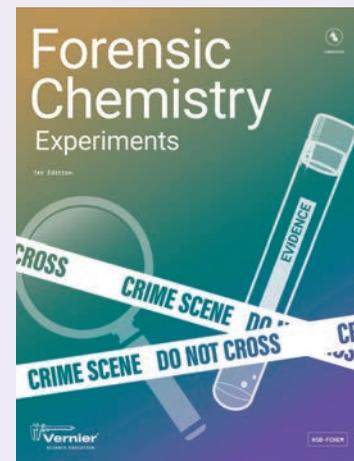
**NEW**

## Forensic Chemistry Experiments

Forensics and its real-world applications are engaging vehicles for learning key scientific concepts. Students investigate scenarios, such as suspected arson and poisonous glasses of wine, while they learn the vital roles that analyzing and interpreting data play in science.

*Forensic Chemistry Experiments* is for teachers who wish to use forensics as a real-world hook to engage students in learning chemistry using Vernier technology.

[vernier.com/hsb-fchem](http://vernier.com/hsb-fchem)



**Download only**

HSB-FCHEM-E \$33

**Printed book + download**

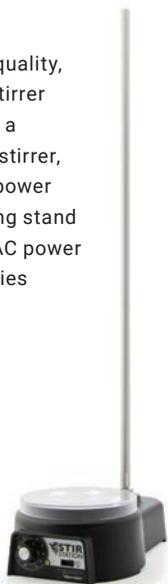
HSB-FCHEM \$41

## Stir Station

The Stir Station is a high-quality, multi-function magnetic stirrer and ring stand. It includes a Stir Station, Vernier Microstirrer, magnetic stirring bar, AC power adapter, and removable ring stand post. It can be used with AC power (included) or four C batteries (not included).

STIR \$149

[vernier.com/stir](http://vernier.com/stir)



## Go Direct Polarimeter

Our polarimeter measures chiral properties of optically active samples such as sugars and amino acids. Because students have a graph that shows a clear change in the light's polarization, they no longer need to determine the optical maximum with their eyes.

GDX-POL \$545

[vernier.com/gdx-pol](http://vernier.com/gdx-pol)

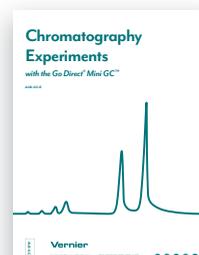


## Go Direct Mini GC

Teach students chromatography with an affordable, portable gas chromatograph that detects polar and nonpolar compounds. With the easy-to-use Go Direct Mini GC™ and the free Vernier Instrumental Analysis® app, students can separate, analyze, and identify substances contained in a volatile liquid or gaseous sample. Go Direct Mini GC connects to your device via Bluetooth® wireless technology or USB.

GDX-GC \$3,599

Learn more at [vernier.com/gdx-gc](http://vernier.com/gdx-gc)



**FREE DOWNLOAD** with purchase of Go Direct Mini GC  
*Chromatography Experiments with the Go Direct Mini GC* e-book

## Go Direct SpectroVis Plus

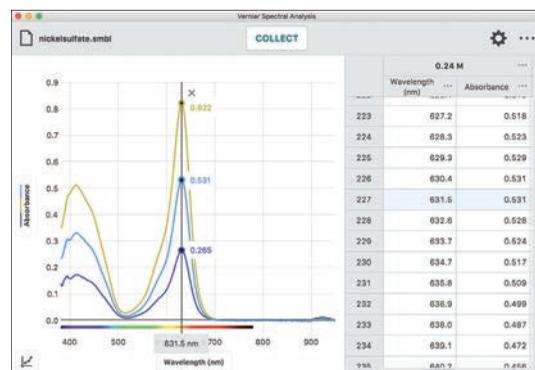
Introduce your students to spectroscopy with the affordable Go Direct SpectroVis® Plus Spectrophotometer. With a range of 380 to 950 nm, students can easily collect a full-wavelength spectrum (absorbance, percent transmittance, fluorescence, or intensity), study absorbance vs. concentration (Beer's law), or monitor rates of reaction (kinetics). Collect and analyze data using Vernier Spectral Analysis® or LabQuest® App.

GDX-SVISPL \$459

[vernier.com/gdx-svispl](http://vernier.com/gdx-svispl)



Our innovative, easy-to-use instruments collect data within seconds. Explore our full suite of spectrometers at [vernier.com/spectrometers](http://vernier.com/spectrometers)



## Vernier Spectral Analysis App

Our free Vernier Spectral Analysis app makes it easy to incorporate spectroscopy into your chemistry experiments. Using the app, students can collect a full spectrum and explore topics such as Beer's law, kinetics, and fluorescence.

This user-friendly software includes analysis features such as curve fitting and data interpolation.

FREE DOWNLOAD

[vernier.com/spectral-analysis](http://vernier.com/spectral-analysis)



## Chemistry Go Direct Starter Package

This package includes four sensors that work with Vernier Graphical Analysis® Pro and LabQuest® 3.

- Go Direct Temperature (2)
- Go Direct Gas Pressure
- Go Direct pH

GDP-CH-ST \$364

[Learn more at vernier.com/gdp-ch-st](http://vernier.com/gdp-ch-st)



## Chemistry Go Direct Standard Package

This package includes 8 sensors that work with Vernier Graphical Analysis Pro and LabQuest 3.

- Go Direct Temperature (2)
- Go Direct Gas Pressure
- Go Direct pH
- Go Direct Voltage
- Go Direct Conductivity
- Go Direct Colorimeter
- Go Direct Drop Counter

GDP-CH-DX \$820

Buy 8 or more packages at \$795 and save \$200.

[Learn more at vernier.com/gdp-ch-dx](http://vernier.com/gdp-ch-dx)



## Chemistry with Vernier

Combine *Chemistry with Vernier* with a package (shown above) to teach students the essentials of chemistry. This lab book contains 36 ready-to-use student experiments and instructor information, including sample data.

[Learn more at vernier.com/cwv](http://vernier.com/cwv)



Download only CWV-E \$44

Printed book + download CWV \$52

MORE CHEMISTRY LAB BOOKS ON PAGE 39

# Featured Products

## Go Direct Sensors

Sensor		Order Code	Price
Go Direct® CO <sub>2</sub> Gas		GDX-CO2	\$225
Go Direct Colorimeter		GDX-COL	\$129
Go Direct Conductivity		GDX-CON	\$129
Go Direct Platinum-Cell Conductivity		GDX-CONPT	\$189
Go Direct Constant Current System		GDX-CCS	\$95
Go Direct Current		GDX-CUR	\$99
Go Direct Drop Counter		GDX-DC	\$109
Go Direct Electrode Amplifier		GDX-EA	\$79
Go Direct Ethanol Vapor		GDX-ETOH	\$169
Go Direct Gas Pressure		GDX-GP	\$99
Go Direct Melt Station		GDX-MLT <sup>‡</sup>	\$599
Go Direct Mini GC™		GDX-GC	\$3,599
Go Direct ORP		GDX-ORP	\$119
<b>pH Sensors</b>			
Go Direct Glass-Body pH		GDX-GPH	\$159

Go Direct pH		GDX-PH	\$109
Go Direct Tris-Compatible Flat pH		GDX-FPH	\$134
Go Direct Polarimeter		GDX-POL	\$545
Go Direct Radiation Monitor		GDX-RAD	\$219
<b>Spectrometers</b>		<a href="http://vernier.com/spectrometers">vernier.com/spectrometers</a>	
Go Direct Emissions Spectrometer		GDX-SPEC-EM	\$950
Go Direct Fluorescence/UV-VIS Spectrophotometer		GDX-SPEC-FUV	\$2,999
Go Direct SpectroVis® Plus		GDX-SVISPL	\$459
Go Direct UV-VIS Spectrophotometer		GDX-SPEC-UV	\$2,499
Go Direct Visible Spectrophotometer		GDX-SPEC-VIS	\$1,899
<b>Temperature Probes</b>			
Go Direct Surface Temperature		GDX-ST	\$99
Go Direct Temperature		GDX-TMP	\$78
Go Direct Thermocouple		GDX-TC	\$118
Go Direct Wide-Range Temperature		GDX-WRT	\$139
Go Direct Voltage		GDX-VOLT	\$89

See all our products for chemistry at [vernier.com/chemistry](http://vernier.com/chemistry)

## Go Direct Charge Station

Accessory	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89

## LabQuest® Sensors

Sensor	Order Code	Price
Colorimeter	COL-BTA	\$128
Conductivity Probes		
Conductivity Probe	CON-BTA	\$125
Platinum-Cell Conductivity Probe	CONPT-BTA	\$170
Current Probes		
Constant Current System	CCS-BTA	\$79
Current Probe	DCP-BTA	\$49
Drop Counter	VDC-BTD	\$109
Electrode Amplifier	EA-BTA	\$55
Gas Pressure Sensor	GPS-BTA	\$94
Instrumentation Amplifier	INA-BTA	\$89
Melt Station	MLT-BTA ⚡	\$629
ORP Sensor	ORP-BTA	\$115
pH Sensors		
Glass-Body pH Electrode BNC (requires Electrode Amplifier)	GPH-BNC	\$95
pH Sensor	PH-BTA	\$99
Tris-Compatible Flat pH Sensor	FPH-BTA	\$124
Polarimeter (Chemical)	CHEM-POL ⚡	\$579
Radiation Monitor	VRM-BTD	\$199

Temperature Probes		
Stainless Steel Temperature Probe	TMP-BTA	\$43
Surface Temperature Sensor	STS-BTA	\$34
Thermocouple	TCA-BTA	\$79
Wide-Range Temperature Probe	WRT-BTA	\$119
Voltage Probes		
Differential Voltage Probe	DVP-BTA	\$49
Voltage Probe	VP-BTA	\$14

## Balances

Sensor	More Info
OHAUS Scout® (120 g) ⚡	<a href="http://vernier.com/ohs-123">vernier.com/ohs-123</a>
OHAUS Scout (220 g) ⚡	<a href="http://vernier.com/ohs-222">vernier.com/ohs-222</a>
OHAUS Scout (420 g) ⚡	<a href="http://vernier.com/ohs-422">vernier.com/ohs-422</a>

## Spectrometers

Spectrometer	Order Code	Price
Go Direct Emissions Spectrometer	GDX-SPEC-EM	\$950
Go Direct Fluorescence/UV-VIS Spectrophotometer	GDX-SPEC-FUV	\$2,999
Go Direct SpectroVis Plus	GDX-SVISPL	\$459
Go Direct UV-VIS Spectrophotometer	GDX-SPEC-UV	\$2,499
Go Direct Visible Spectrophotometer	GDX-SPEC-VIS	\$1,899

## Gas Chromatograph

Gas Chromatograph	Order Code	Price
Go Direct Mini GC	GDX-GC	\$3,599

## Lab Equipment and Accessories

Accessory	Order Code	Price
Cuvette Rack	CUV-RACK	\$9
Electrode Support	ESUP	\$10
Melt Station Capillary Tubes	MLT-TUBE	\$24
Plastic Cuvettes (100)	CUV	\$24
Stir Station	STIR	\$149

## Lab Books†

Book Title	Order Code	Price
<i>Chemistry with Vernier</i>	CWV	\$52
<i>Advanced Chemistry with Vernier</i>	CHEM-A	\$52
<i>Vernier Chemistry Investigations for Use with AP* Chemistry</i>	APCHEM	\$52
<i>Investigating Chemistry through Inquiry</i>	CHEM-I	\$52
<i>Food Chemistry Experiments</i>	HSB-FOOD	\$41
<b>NEW</b> <i>Forensic Chemistry Experiments</i>	HSB-FCHEM	\$41
<i>Organic Chemistry with Vernier</i>	CHEM-O	\$52

† Books listed here include printed book and download; also available as a download only.

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## Looking for Replacement Parts?

Visit [vernier.com/replacements](http://vernier.com/replacements)

HIGH SCHOOL

# Physical Science

From matter and energy to motion and forces, Vernier offers the support you need and the technology your students can use to investigate physical science.

[vernier.com/physical-science](http://vernier.com/physical-science)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## Go Direct Sensor Carts

With our Go Direct® Sensor Carts, students can explore force, position, velocity, and acceleration directly on their devices via Bluetooth® wireless technology—no wires or additional equipment required. Each cart features built-in sensors to simplify experiment setup.

**Go Direct Sensor Cart (Green)**

GDX-CART-G \$199

**Go Direct Sensor Cart (Yellow)**

GDX-CART-Y \$199

[vernier.com/gdx-cart](http://vernier.com/gdx-cart)



## Go Direct Temperature

MOST POPULAR

Students can use this rugged, general-purpose sensor to monitor temperature.

Range: -40 to 125°C

GDX-TMP \$78

[vernier.com/gdx-tmp](http://vernier.com/gdx-tmp)



## Go Direct Temperature Teacher Pack

GDX-TMP-TP \$692

Includes 8 Go Direct Temperature Probes and a Go Direct Charge Station.



## Go Direct Light and Color

Students use this sensor to measure the brightness of a light bulb or the reflectance of light from various objects. They can also measure UV light and relative amounts of red, blue, and green light.

GDX-LC \$99

[vernier.com/gdx-lc](http://vernier.com/gdx-lc)



## Go Direct Force and Acceleration

Students can use this sensor to measure forces of up to 50 N. The included 3-axis accelerometer makes it a versatile sensor for many topics in physical science.

GDX-FOR \$119

[vernier.com/gdx-for](http://vernier.com/gdx-for)



## Go Direct Sensors

Sensor	Order Code	Price
Go Direct 3-Axis Magnetic Field	GDX-3MG	\$89
Go Direct Acceleration	GDX-ACC	\$114
Carts and Tracks		
Dynamics Cart and Track System with Go Direct Sensor Carts	DTS-GDX	\$619
Go Direct Sensor Cart (Green)	GDX-CART-G	\$199
Go Direct Sensor Cart (Yellow)	GDX-CART-Y	\$199
Go Direct Conductivity	GDX-CON	\$129
Go Direct Current	GDX-CUR	\$99
Go Direct Energy	GDX-NRG	\$98
Go Direct Force and Acceleration	GDX-FOR	\$119
Go Direct Gas Pressure	GDX-GP	\$99
Go Direct Light and Color	GDX-LC	\$99
Go Direct Motion	GDX-MD	\$124
Go Direct pH	GDX-PH	\$109
Go Direct Photogate	GDX-VPG	\$95
Go Direct Sound	GDX-SND	\$98
Go Direct Structures & Materials Tester	GDX-VSMT	\$1,199
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Thermocouple	GDX-TC	\$118
Go Direct Voltage	GDX-VOLT	\$89

## Go Direct pH

Go Direct pH is a general-purpose pH sensor used to monitor pH of aqueous solutions.

GDX-PH \$109

[vernier.com/gdx-ph](http://vernier.com/gdx-ph)

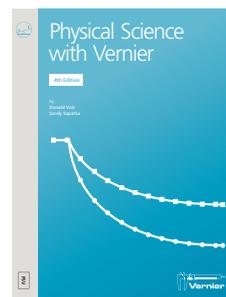


## Physical Science with Vernier

*Physical Science with Vernier* contains 40 ready-to-use experiments for physical science. Experiments are included for nine Vernier sensors and cover a variety of topics in chemistry and physics.

Topics include

- Structures and properties of matter
- Forces and interactions
- Waves and electromagnetic radiation
- Chemical reactions



[vernier.com/psv](http://vernier.com/psv)

**Printed book + download**  
PSV \$52

**Download only**  
PSV-E \$44

## Go Direct Charge Station

Accessory	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89

## Lab Books

Title	Order Code	Price
<i>Physical Science with Vernier</i>	Printed book + download: PSV	\$52
	Download only: PSV-E	\$44

See all our products for physical science at [vernier.com/physical-science](http://vernier.com/physical-science)

HIGH SCHOOL

# Physics

From kinematics to optics, Vernier technology helps your students connect the dots between the classroom and the real world. Our physics products enable student and educator success so that you can spend less time troubleshooting and more time teaching your students about the scientific principles of the world around them.

[vernier.com/physics](http://vernier.com/physics)

## NEW Cart Fan

The Cart Fan is a modular fan you can add to DTS and Go Direct carts that provides a constant force for dynamics investigations. Using one or multiple fans on a single cart allows students to investigate constant acceleration, balanced/unbalanced forces, and variable thrust angles.

DTS-CFAN \$89

[vernier.com/dts-cfan](http://vernier.com/dts-cfan)



FOR MORE INFORMATION ABOUT CART AND TRACK SYSTEMS, SEE PAGE 46.

## NEW Go Direct Force Plate

Measure the forces developed during stepping, jumping, and other human-scale actions. Observe change in apparent weight as you ride an elevator or measure reaction forces as you lean against a wall.

GDX-FP \$399

[vernier.com/gdx-fp](http://vernier.com/gdx-fp)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## Go Direct Motion

Go Direct® Motion uses ultrasound to measure the position, velocity, and acceleration of moving objects.

GDX-MD \$124

[vernier.com/gdx-md](http://vernier.com/gdx-md)



## Go Direct Force and Acceleration

Measure forces as small as  $\pm 0.1$  N and up to  $\pm 50$  N with this sensor that couples a 3-axis accelerometer with a stable and accurate force sensor. Use it to measure pushes and pulls in the classroom or outdoors.

GDX-FOR \$119

[vernier.com/gdx-for](http://vernier.com/gdx-for)



## Go Direct Photogate

This double-gate sensor includes two photogates built into the arms of the sensor. It accurately measures velocity and acceleration.

GDX-VPG \$95

[vernier.com/gdx-vpg](http://vernier.com/gdx-vpg)



## Go Direct Acceleration

Collect acceleration, rotation, and altitude data in the classroom or in the field.

GDX-ACC \$114

[vernier.com/gdx-acc](http://vernier.com/gdx-acc)



## Go Direct Voltage

This sensor combines a wide input voltage range and high precision, making it an excellent choice for investigations of both AC/DC circuits and electromagnetism.

GDX-VOLT \$89

[vernier.com/gdx-volt](http://vernier.com/gdx-volt)



## Go Direct Current

Measure electric currents in circuits with this versatile sensor.

GDX-CUR \$99

[vernier.com/gdx-cur](http://vernier.com/gdx-cur)



## Go Direct 3-Axis Magnetic Field

Determine the magnitude and direction of a magnetic field at any point in space with this 3-axis sensor.

GDX-3MG \$89

[vernier.com/gdx-3mg](http://vernier.com/gdx-3mg)



## Go Direct Sound

Use this sensor to easily capture and evaluate waveforms, or measure sound level in decibels.

GDX-SND \$98

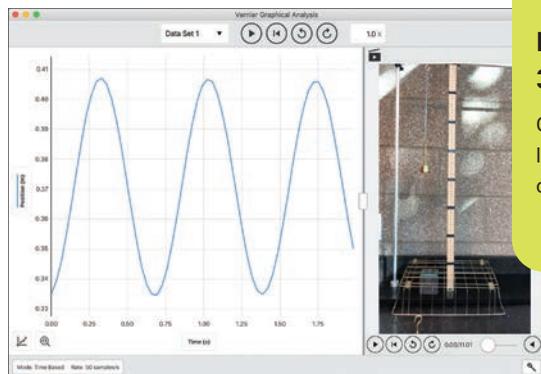
[vernier.com/gdx-snd](http://vernier.com/gdx-snd)



## Vernier Graphical Analysis Pro

Unlock key features with Vernier Graphical Analysis® Pro and do more with your Vernier sensors to deepen and extend learning. With access to Pro, you can enrich live instruction while providing more opportunities for students to interact with and analyze data outside of class time.

[vernier.com/graphical-analysis](http://vernier.com/graphical-analysis)



**FREE  
30-DAY TRIAL**

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### Advanced Physics with Vernier—Mechanics

Teach mechanics concepts at the Advanced Placement or college level. Experiments are designed for an interactive teaching style, with planned moments for instructor- or student-led discussion.

**Printed book + download** PHYS-AM \$52  
**Download only** PHYS-AM-E \$44

[vernier.com/phys-am](http://vernier.com/phys-am)



### Advanced Physics with Vernier—Beyond Mechanics

The second of a two-volume set, this book focuses on second-semester topics in college physics. It is recommended for AP\* and IB<sup>2</sup> physics courses.

**Printed book + download** PHYS-ABM \$52  
**Download only** PHYS-ABM-E \$44

[vernier.com/phys-abm](http://vernier.com/phys-abm)



## Vernier Video Analysis

The Vernier Video Analysis® app brings video analysis to your students in an easy-to-use, streamlined application. Students can design their own scientific investigations, record videos, and then analyze the motion. This app gives your students the opportunity to observe and study hard-to-replicate phenomena regardless of device—it even works with Chromebooks!

[vernier.com/video-analysis](http://vernier.com/video-analysis)



**FREE  
30-DAY TRIAL**

Get a 30-day free trial and learn about site license options and e-books at [vernier.com/video-analysis](http://vernier.com/video-analysis)

### Vernier Video Analysis: Motion and Sports

In addition to traditional physics concepts such as velocity and acceleration, the 12 investigations in this book include analysis of sports activities. This further connects concepts of motion to students' daily lives.

**Download only** HSB-VVAMS-E \$28

[vernier.com/hsb-vvams-e](http://vernier.com/hsb-vvams-e)



### Vernier Video Analysis: Conservation Laws and Forces

Examine topics beyond basic motion using the 12 investigations in this book. Like its counterpart (left), videos are included in the electronic download, making it easy to integrate video analysis into homework or classwork.

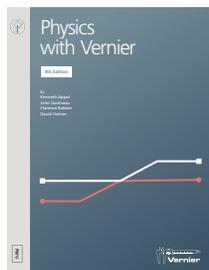
**Download only** HSB-VVACLf-E \$28

[vernier.com/hsb-vvaclf-e](http://vernier.com/hsb-vvaclf-e)



## Physics with Vernier

*Physics with Vernier* has 35 experiments in mechanics, sound, light, electricity, and magnetism. This book has a wide variety of experiments for motion detectors, force sensors, light sensors, magnetic field sensors, photogates, temperature probes, and more.



**Printed book + download** PWV \$52  
**Download only** PWV-E \$44

[vernier.com/pwv](http://vernier.com/pwv)

## Sensor Cart Physics

**(Go Direct sensors only)**

Students use the Vernier Go Direct® Sensor Cart to complete the 21 investigations in this e-book—the guided-inquiry format gives students agency in choosing what they measure and analyze.



**Download only** HSB-SCP-E \$40

[vernier.com/hsb-scp-e](http://vernier.com/hsb-scp-e)

## Physics Explorations and Projects

*Physics Explorations and Projects* is a collection of investigations aligned to the NGSS. These investigations invite students to explore phenomena without extensive instructions. The guided-inquiry format encourages students to choose what variables to measure and analyze.



**Printed book + download** PEP \$52  
**Download only** PEP-E \$44

[vernier.com/pep](http://vernier.com/pep)

## Physics Go Direct Standard Package

This package includes 12 products that work with Vernier Graphical Analysis Pro and LabQuest® 3.

- Go Direct Motion
- Go Direct Force and Acceleration
- Go Direct Voltage
- Go Direct Current (2)
- Go Direct Photogate
- Go Direct Acceleration
- Go Direct Sound
- Go Direct Light and Color
- Go Direct 3-Axis Magnetic Field
- Ultra Pulley Attachment
- Picket Fence



GDP-PHY-DX \$1,059

Buy 8 or more packages at \$1,027 and save \$256.

Learn more at [vernier.com/gdp-phy-dx](http://vernier.com/gdp-phy-dx)

## LabQuest 3 Physics Standard Package

This package includes 13 products that work with Vernier Graphical Analysis Pro and LabQuest 3.

- Vernier LabQuest 3 Interface
- Motion Detector
- Go Direct Force and Acceleration
- Differential Voltage Probe
- Current Probe (2)
- Go Direct Photogate
- Go Direct Acceleration
- Go Direct Sound
- Light Sensor †
- Go Direct 3-Axis Magnetic Field
- Ultra Pulley Attachment
- Picket Fence



LQ3-PHY-DX † \$1,263

Buy 8 or more packages at \$1,225 and save \$304.

Learn more at [vernier.com/lq3-phy-dx](http://vernier.com/lq3-phy-dx)

† For California Proposition 65 warning, see pp. 78–79.

\* AP and Advanced Placement Program are registered trademarks of the College Entrance Examination Board, which was not involved in the production of and does not endorse this product.

† The IB Diploma Program is an official program of the International Baccalaureate Organization (IBO) which authorizes schools to offer it. The material available here has been developed independently of the IBO and is not endorsed by it.

## Dynamics Cart and Track Systems

### One Dynamics System—Three Ways to Collect Data

Depending on your budget and your needs, we offer three ways to collect motion data.

### 1 Go Direct Sensor Cart

The wireless Go Direct® Sensor Cart includes an optical encoder on a wheel to sense the displacement of the cart, on or off the track. No interface is needed to use this system with the Vernier Graphical Analysis® Pro app. Students can perform impulse and momentum experiments with the built-in force sensor, and the 3-axis accelerometer means you can take your Sensor Cart off campus to investigate accelerations on a swing or merry-go-round.

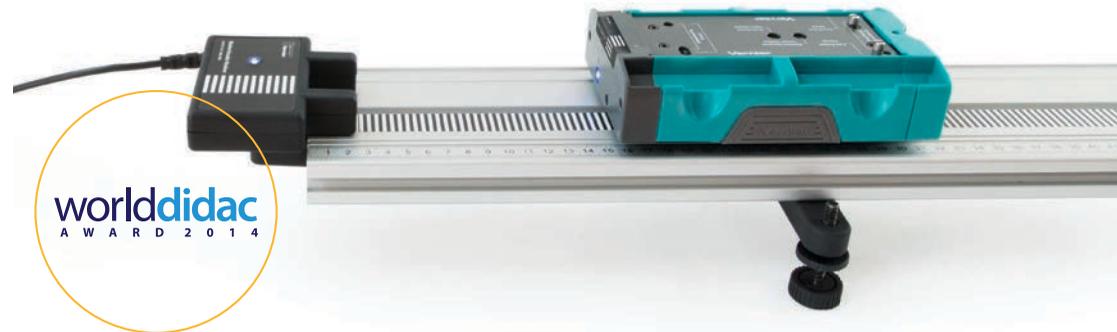


### 2 The Motion Encoder\*

VERNIER EXCLUSIVE

For classrooms already equipped with data-collection interfaces, the Motion Encoder dramatically improves data quality and simplifies experiment setup over the traditional ultrasonic Motion Detector. An optical sensor under the dynamics cart senses the passage of the cart over a striped decal on the track. The displacement information is sent as an encoded IR signal to a receiver at the track's end. This optical-only system provides excellent, repeatable, and noise-resistant data.

\* U.S. Patent No. 9,488,503



### 3 A Traditional Motion Detector

The Motion Detector is the classic method for collecting position data. Use a Motion Detector bracket to measure cart motion for the entire length of the track. You can even use two Motion Detectors at once to study cart collisions.

Unlike the Motion Encoder or Go Direct Sensor Cart, the Motion Detector can be used for dynamics experiments other than cart-on-track experiments. Students can graph their own walking motion, study a simple pendulum, or graph a ball toss with a Motion Detector. If you want to use only a Motion Detector for all of your motion experiments, get the Dynamics Cart and Track System without the Motion Encoder or Go Direct Sensor Cart.



## Dynamics Cart and Track System with Go Direct Sensor Cart

BUILT-IN SENSORS = LOWER TOTAL COST

The Dynamics Cart and Track System with Go Direct® Sensor Cart includes essential laboratory equipment for teaching dynamics and kinematics. With our Go Direct Sensor Cart, students can explore force, position, velocity, and acceleration directly on their device using Bluetooth® wireless technology. There are no wires to create drag, and no additional equipment is required! Each cart features built-in sensors that simplify experiment setup and make this system the best choice for studying dynamics and kinematics.

with 1.2 m Track DTS-GDX \$619

[vernier.com/dts-gdx](http://vernier.com/dts-gdx)

with 2.2 m Track DTS-GDX-LONG \$728

[vernier.com/dts-gdx-long](http://vernier.com/dts-gdx-long)



## Dynamics Cart and Track System with Motion Encoder

THIS OPTION REQUIRES AN INTERFACE SUCH AS LABQUEST 3 OR LABQUEST MINI

The Dynamics Cart and Track System with Motion Encoder includes an optical position sensing system to record cart motion.

with 1.2 m Track DTS-EC \$529

[vernier.com/dts-ec](http://vernier.com/dts-ec)

with 2.2 m Track DTS-EC-LONG \$638

[vernier.com/dts-ec-long](http://vernier.com/dts-ec-long)



## Dynamics Cart and Track System

USE WITH SENSORS YOU ALREADY OWN—SENSORS ARE NOT INCLUDED

The Dynamics Cart and Track System features the Combination Track/Optics Bench, two low-friction plastic carts (one standard and one with an adjustable plunger), and attachment accessories.

with 1.2 m Track DTS \$349

[vernier.com/dts](http://vernier.com/dts)

with 2.2 m Track DTS-LONG \$458

[vernier.com/dts-long](http://vernier.com/dts-long)



## NEW Cart Fan

The Cart Fan is a modular fan you can add to DTS and Go Direct carts that provides a constant force for dynamics investigations. Using one or multiple fans on a single cart allows students to investigate constant acceleration, balanced/unbalanced forces, and variable thrust angles.

DTS-CFAN \$89

[vernier.com/dts-cfan](http://vernier.com/dts-cfan)



## Friction Pad DTS

Add a Friction Pad to any of our plastic dynamics carts to study the effect of consistent friction on the motion of the cart.

DTS-PAD \$32

[vernier.com/dts-pad](http://vernier.com/dts-pad)



## Motion Encoder Cart and Receiver

This kit includes a fully assembled Motion Encoder Cart, as well as the Motion Encoder Receiver and Motion Encoder Long Track Strip.

DTS-MEC \$267

[vernier.com/dts-mec](http://vernier.com/dts-mec)



## Eddy Current Brake

Eddy current brakes are used as a braking system for high-speed trains and roller coasters. Recreate this unusual braking system in your classroom or laboratory by installing our Eddy Current Brake into the end cap of a plastic Vernier dynamics cart. As the cart moves over the track, the magnets in the Eddy Current Brake create an electromagnetic drag on the cart that is proportional to the cart's speed.

DTS-ECB \$19

[vernier.com/dts-ecb](http://vernier.com/dts-ecb)



## Bumper and Launcher Kit

With the Bumper and Launcher Kit, students can use the Dynamics Cart and Track System to perform Hooke's law experiments or study momentum and impulse.

The kit includes

- Clay (~20 grams)
- Clay holders (2)
- Dual-magnet bumper
- Force sensor mounting screw
- Hoop bumpers (2)
- Magnetic bumpers (2)
- Rubber bumpers (2)
- Track bracket

BLK \$99

[vernier.com/blk](http://vernier.com/blk)



Track and Force Sensor not included

# 1D Motion and Force



## Go Direct Motion

Go Direct® Motion uses ultrasound to measure the position, velocity, and acceleration of moving objects.

GDX-MD \$124

[vernier.com/gdx-md](http://vernier.com/gdx-md)

## Go Direct Photogate

This double-gate sensor includes two photogates built into the arms of the sensor. It accurately measures velocity and acceleration.

GDX-VPG \$95

[vernier.com/gdx-vpg](http://vernier.com/gdx-vpg)



## Go Direct Sensor Carts

We've added wireless sensors to our popular dynamics cart. Each cart includes an encoder wheel to report position, velocity, and acceleration. Conduct basic physics investigations with or without a track.

Go Direct® Sensor Cart (Green)

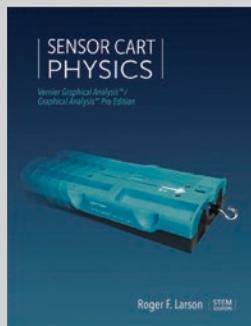
GDX-CART-G \$199

Go Direct Sensor Cart (Yellow)

GDX-CART-Y \$199

INCLUDES  
22  
EXPERIMENTS

### Sensor Cart Physics



Download only  
HSB-SCP-E \$40



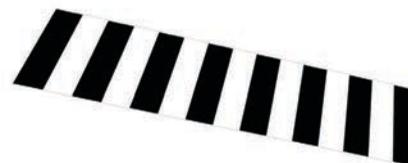
[vernier.com/gdx-cart](http://vernier.com/gdx-cart)

## Picket Fence

Picket Fences have eight opaque bars spaced every 5 cm, silk-screened directly onto clear plastic. Drop the picket fence through a photogate to obtain records of position, velocity and acceleration vs. time in order to measure  $g$ .

PF \$10

[vernier.com/pf](http://vernier.com/pf)



## Ultra Pulley Attachment

Add an Ultra Pulley to your Photogate to monitor motion as a string passes over the pulley or as the pulley rolls along a table.

SPA \$24

[vernier.com/spa](http://vernier.com/spa)



## NEW Go Direct Force Plate

Measure the forces developed during stepping, jumping, and other human-scale actions. Observe change in apparent weight as you ride an elevator, or measure reaction forces as you lean against a wall.

GDX-FP \$399

[vernier.com/gdx-fp](http://vernier.com/gdx-fp)



## Go Direct Force and Acceleration

Measure forces as small as  $\pm 0.1$  N and up to  $\pm 50$  N with this sensor that couples a 3-axis accelerometer with a stable and accurate force sensor. Use it to measure pushes and pulls in the classroom or outdoors.

GDX-FOR \$119

[vernier.com/gdx-for](http://vernier.com/gdx-for)



## LabQuest Products for 1D Motion and Force

Product		Order Code	Price
<b>Accelerometers</b>			
Low-g Accelerometer <a href="http://vernier.com/lga-bta">vernier.com/lga-bta</a>		LGA-BTA	\$99
3-Axis Accelerometer <a href="http://vernier.com/3d-bta">vernier.com/3d-bta</a>		3D-BTA	\$105
25-g Accelerometer <a href="http://vernier.com/acc-bta">vernier.com/acc-bta</a>		ACC-BTA	\$110
Dual-Range Force Sensor <a href="http://vernier.com/dfs-bta">vernier.com/dfs-bta</a>		DFS-BTA	\$120
Force Plate <a href="http://vernier.com/fp-bta">vernier.com/fp-bta</a>		FP-BTA	\$359
<b>Motion Detectors</b>			
Motion Detector <a href="http://vernier.com/md-btd">vernier.com/md-btd</a>		MD-BTD	\$99
Go! Motion <a href="http://vernier.com/go-mot">vernier.com/go-mot</a>		GO-MOT	\$139
Photogate <a href="http://vernier.com/vpg-btd">vernier.com/vpg-btd</a>		VPG-BTD	\$55

## Go Direct Projectile Launcher

Use the Go Direct® Projectile Launcher to investigate important concepts in two-dimensional kinematics. Launch steel balls at angles between 0 and 90 degrees and over distances up to 2.5 m.

GDX-PL \$499

[vernier.com/gdx-pl](http://vernier.com/gdx-pl)



### Independence of Motion Accessory

The Independence of Motion Accessory enables students to use the Vernier Projectile Launcher to perform the classic experiment where one ball is dropped as another is projected horizontally. The balls strike the floor simultaneously.

IOM-VPL \$59

[vernier.com/iom-vpl](http://vernier.com/iom-vpl)



### Time of Flight Pad

The Time of Flight Pad is used with a projectile launcher or photogate (not included) to precisely measure how long a projectile has been in motion.

TOF-VPL \$84

[vernier.com/tof-vpl](http://vernier.com/tof-vpl)



## NEW Go Direct Rotary Motion Package

The Go Direct Rotary Motion Sensor and Rotational Motion Accessory Kit can be used to study rotational inertia, conservation of angular momentum, and additional rotational motion concepts.

GDX-RMPK \$314

[vernier.com/gdx-rmpk](http://vernier.com/gdx-rmpk)



### Go Direct Rotary Motion

Measure angular displacement, angular velocity, and angular acceleration easily and precisely.

GDX-RMS \$189

[vernier.com/gdx-rms](http://vernier.com/gdx-rms)



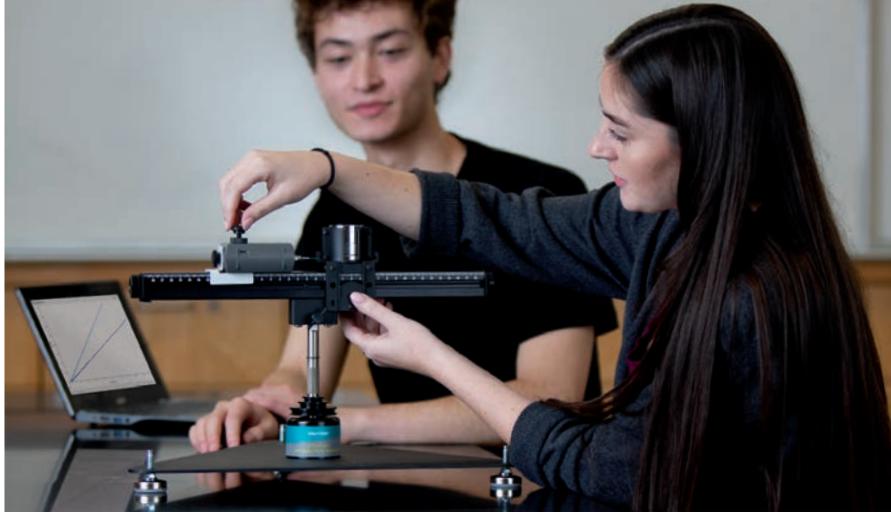
### Rotational Motion Accessory Kit

Use this kit with a rotary motion sensor to study the motion of a physical pendulum; the rotational inertia of disks, rings, and point masses; and the conservation of angular momentum.

AK-RMV \$125

[vernier.com/ak-rmv](http://vernier.com/ak-rmv)





## **NEW** Go Direct Centripetal Force System

Easily measure angular velocity and centripetal force and acceleration without the hassle of wires using this system (includes a Go Direct Centripetal Force Apparatus and Go Direct Force and Acceleration).

GDX-CFAF \$444

[vernier.com/gdx-cfaf](http://vernier.com/gdx-cfaf)



### Go Direct Centripetal Force Apparatus

This rotational system mounted on a solid base is designed to work with Go Direct® Force and Acceleration (not included).

GDX-CFA \$325

[vernier.com/gdx-cfa](http://vernier.com/gdx-cfa)



### Moment of Inertia Kit

Expand the capabilities of a Vernier centripetal force apparatus to investigate moments of inertia of different geometries.

CFA-MIK \$219

[vernier.com/cfa-mik](http://vernier.com/cfa-mik)



### Motor Accessory Kit

Control the rotational rate of the Go Direct Centripetal Force Apparatus so students can focus on a single variable.

GDX-CFA-MAK \$199

[vernier.com/gdx-cfa-mak](http://vernier.com/gdx-cfa-mak)



## Go Direct Force and Acceleration

Measure forces as small as  $\pm 0.1$  N and up to  $\pm 50$  N with this sensor that couples a 3-axis accelerometer with a stable and accurate force sensor. Use it to measure pushes and pulls in the classroom or outdoors.

GDX-FOR \$119

[vernier.com/gdx-for](http://vernier.com/gdx-for)

### **NEW** Hanging Masses

PHY-HM250 \$23

### **NEW** Friction Block

PHY-FRBL \$17

# Electricity and Magnetism

## Go Direct Voltage

This sensor combines a wide input voltage range and high precision, making it an excellent choice for investigations of both AC/DC circuits and electromagnetism.

GDX-VOLT \$89

[vernier.com/gdx-volt](http://vernier.com/gdx-volt)



## Go Direct Current

Measure electric currents in circuits with this versatile sensor.

GDX-CUR \$99

[vernier.com/gdx-cur](http://vernier.com/gdx-cur)



## Go Direct 3-Axis Magnetic Field

Determine the magnitude and direction of a magnetic field at any point in space with this 3-axis sensor.

GDX-3MG \$89

[vernier.com/gdx-3mg](http://vernier.com/gdx-3mg)



## Go Direct Static Charge

Unlike a traditional electroscope, Go Direct Static Charge offers a means for quantitative measurement and analysis of positive and negative charges of objects that would not be possible in a traditional lab—such as measuring the charge on a balloon.

GDX-Q \$109

[vernier.com/gdx-q](http://vernier.com/gdx-q)



## High Current Sensor

Range:  $\pm 10$  A

HCS-BTA \$89 [vernier.com/hcs-bta](http://vernier.com/hcs-bta)



## Instrumentation Amplifier

Range:  $\pm 1$  V

INA-BTA \$89 [vernier.com/ina-bta](http://vernier.com/ina-bta)



## 30-Volt Voltage Probe

Range:  $\pm 30$  V

30V-BTA \$59 [vernier.com/30v-bta](http://vernier.com/30v-bta)



## Power Amplifier

Use this as a power supply for DC and AC circuit investigations or to drive devices such as speakers, lamps, and small DC motors.

PAMP \$249 [vernier.com/pamp](http://vernier.com/pamp)



## Vernier Circuit Board 2

Use this convenient platform to study basic series and parallel circuits as well as RLC circuits. Many components for experimentation are provided.

VCB2 \$145 [vernier.com/vcb2](http://vernier.com/vcb2)



## Extech® Digital Power Supply

This power supply provides constant current or constant voltage for physics activities that require DC power.

EXPS \$259 [vernier.com/exp](http://vernier.com/exp)



## Electrostatics Kit

Students use the Electrostatics Kit to perform a range of experiments in electrostatics with Go Direct Static Charge.

ESK-CRG \$129 [vernier.com/esk-crg](http://vernier.com/esk-crg)



# Thermodynamics



## FLIR ONE Thermal Cameras

Using a FLIR ONE® thermal camera, students can observe temperature changes on the skin, illustrate convection, track heating due to friction, compare heat conduction in different materials, analyze the transparency of materials in infrared compared to visible light, and so much more.

[vernier.com/flir](http://vernier.com/flir)



FLIR ONE Pro\*

FLIRPRO-IOS ⚡

[vernier.com/flirpro-ios](http://vernier.com/flirpro-ios)



FLIR ONE Gen 3\*

FLIRONE3-IOS ⚡

[vernier.com/flirone3-ios](http://vernier.com/flirone3-ios)

\*iOS only

## Gas Pressure Sensors

### Go Direct Gas Pressure

Range: 0 to 400 kPa

GDX-GP \$99



### Gas Pressure Sensor

Range: 0 to 210 kPa

GPS-BTA \$94



[vernier.com/gas-pressure-sensors](http://vernier.com/gas-pressure-sensors)

## Temperature Probes

### Go Direct Surface Temperature

Range: -25 to 125°C

GDX-ST \$99



### Surface Temperature Sensor

Range: -25 to 125°C

STS-BTA \$34



### Go Direct Temperature

Range: -40 to 125°C

GDX-TMP \$78



### Stainless Steel Temperature Probe

Range: -40 to 135°C

TMP-BTA \$43



[vernier.com/temperature-sensors](http://vernier.com/temperature-sensors)

**NEW**

## Resonance Apparatus

The Resonance Apparatus is used for the classic experiment of determining the speed of sound using the principle of resonance in a tube that is closed at one end. Fill the apparatus with water and use a tuning fork or the included speaker to produce sound. Listen for the resonance while moving the inner tube, or use a sound sensor to locate the resonance lengths.

RES-APP \$199

[vernier.com/res-app](http://vernier.com/res-app)



Watch the video

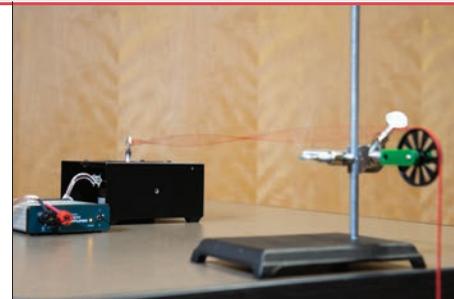


## Frequency Generator

Easily connect the Frequency Generator to the Power Amplifier to create sine, square, sawtooth, and triangle waves at a wide range of frequencies. It also outputs DC voltage.

FGEN-PAMP \$189

[vernier.com/fgen-pamp](http://vernier.com/fgen-pamp)



## Power Amplifier

Drive devices such as speakers, lamps, and small DC motors.

PAMP \$249

[vernier.com/pamp](http://vernier.com/pamp)



## Microphone

Display and study the waveforms of sounds from voices and musical instruments. This sensor is also appropriate for speed of sound experiments.

MCA-BTA \$55 [vernier.com/mca-bta](http://vernier.com/mca-bta)



## Go Direct Sound

Use Go Direct® Sound to easily capture and evaluate waveforms.

GDX-SND \$98

[vernier.com/gdx-snd](http://vernier.com/gdx-snd)



## Sound Level Sensor

Use the Sound Level Sensor to easily measure sound level in decibels (dB) in a variety of experiments.

Range: 55 to 110 dB

SLS-BTA \$69 [vernier.com/sls-bta](http://vernier.com/sls-bta)



## Power Amplifier Accessory Speaker

Study mechanical waves on strings and springs.

PAAS-PAMP ⚡ \$155

[vernier.com/paas-pamp](http://vernier.com/paas-pamp)



## Go Direct Light and Color

Measure light intensity in the visible to ultraviolet electromagnetic spectrum. An RGB color sensor detects relative contributions of primary colors in light.

GDX-LC \$99

[vernier.com/gdx-lc](http://vernier.com/gdx-lc)



## Light Sensor

Investigate polarizers, reflectivity, and solar energy with this sensor that approximates the human eye in spectral response. It's great for inverse square law experiments.

LS-BTA \$69

[vernier.com/ls-bta](http://vernier.com/ls-bta)



## Optics Expansion Kit

Use the Optics Expansion Kit with your dynamics track (not included) to conduct optics experiments, such as image formation with lenses and light intensity vs. distance. You can even use the kit to build a basic telescope.

Kit includes

- 3 lenses (100 mm converging lens, 200 mm converging lens, -150 mm diverging lens)
- Screen
- Combination luminous and point light source
- Light Sensor Holder\*
- Aperture screen
- Power supply

The Optics Expansion Kit is used in *Physics with Vernier* and *Advanced Physics with Vernier—Beyond Mechanics* experiments.

OEK \$199

Download free sample experiments at [vernier.com/oek](http://vernier.com/oek)

\* The Light Sensor Holder can be used with any style Vernier light sensor.

## Combination Dynamics Track and Optical Bench

The Combination Dynamics Track and Optical Bench is aluminum and includes a metric scale. Extremely rigid, this 1.2 (or 2.2) meter track will not sag under use. The track includes two Adjustable Two Foot Levelers.

with 1.2 m Track TRACK \$155

[vernier.com/track](http://vernier.com/track)

with 2.2 m Track TRACK-LONG \$264

[vernier.com/track-long](http://vernier.com/track-long)

## Polarizer/Analyzer Set

PAK-OEK \$89

[vernier.com/pak-oek](http://vernier.com/pak-oek)



## Mirror Set

M-OEK \$69

[vernier.com/m-oek](http://vernier.com/m-oek)



Light source not included

## Color Mixer

CM-OEK \$189

Download a free sample experiment at [vernier.com/cm-oek](http://vernier.com/cm-oek)



## Diffraction Apparatus

Using the Diffraction Apparatus, with its included Red Diffraction Laser, high-precision slits, and High Sensitivity Light Sensor, students can create, view, and measure diffraction and interference patterns.

The Diffraction Apparatus requires a Combination Track/Optics Bench (not included).

DAK \$669

[vernier.com/dak](http://vernier.com/dak)



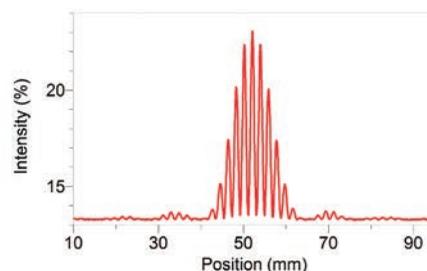
## Combination 1.2 m Track/Optics Bench

TRACK \$155 [vernier.com/track](http://vernier.com/track)

## Green Diffraction Laser (optional)

Add this to your Diffraction Apparatus to study the effect of wavelength on a diffraction pattern.

GDL-DAK \$250 [vernier.com/gdl-dak](http://vernier.com/gdl-dak)



See website for replacement parts.

## Go Direct Emissions Spectrometer

This emissions spectrometer connects to your device via Bluetooth® wireless technology or USB to give precise measurements over a range of 350–900 nm. Use it with or without an optical fiber (not included) to examine spectra of light bulbs, spectrum tubes, or the sun.

GDX-SPEC-EM \$950

[vernier.com/gdx-spec-em](http://vernier.com/gdx-spec-em)



### Vernier Emissions Fiber

VSP-EM-FIBER \$94

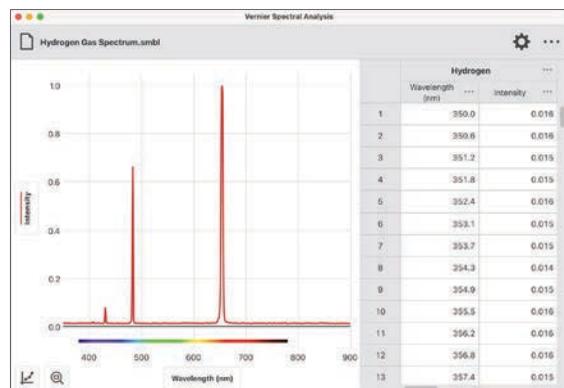
[vernier.com/vsp-em-fiber](http://vernier.com/vsp-em-fiber)



## Vernier Spectral Analysis App

Our free Vernier Spectral Analysis® app makes it easy to incorporate spectroscopy into your physics lab. Using the app, students can analyze spectra from diverse sources such as spectrum tubes, light bulbs, and the sun.

[vernier.com/spectral-analysis](http://vernier.com/spectral-analysis)



## Radiation Monitors

### Go Direct Radiation Monitor

Explore radiation statistics, measure the rate of nuclear decay, and monitor radon progeny. Go Direct® Radiation Monitor detects alpha, beta, gamma, and X-ray radiation, and includes LED and audible indicators.

GDX-RAD \$219

[vernier.com/gdx-rad](http://vernier.com/gdx-rad)



### Vernier Radiation Monitor

The Vernier Radiation Monitor detects alpha, beta, gamma, and X-ray radiation and can be used for experiments in nuclear counting statistics, shielding, and decay rate measurements.

VRM-BTD \$199

[vernier.com/vrm-btd](http://vernier.com/vrm-btd)



## Spectrum Tube Single Power Supply

These power supplies feature an ultra-safe design for electrifying spectrum tubes.

ST-SPS ⚡ \$299

[vernier.com/st-sps](http://vernier.com/st-sps)



## Spectrum Tubes

Spectrum Tubes are permanently enclosed in protective plastic carriers, with no exposed high voltage.

All Spectrum Tubes are sold separately:

Hydrogen	ST-H ⚡	\$49
Nitrogen	ST-N ⚡	\$49
Helium	ST-HE ⚡	\$49
Neon	ST-NE ⚡	\$49
Carbon Dioxide	ST-CO2 ⚡	\$49
Air	ST-AIR ⚡	\$49
Argon	ST-AR ⚡	\$49



[vernier.com/spectrum-tubes](http://vernier.com/spectrum-tubes)

*Spectrum Tubes carry a two-year warranty (hydrogen tube: two years or 40 hours, whichever comes first; all other tubes: two years or 100 hours, whichever comes first).*

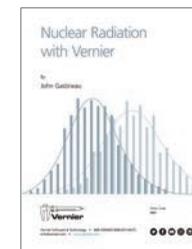
## Nuclear Radiation with Vernier

This free e-book includes six experiments for data collection with a radiation monitor:

- Distance and Radiation
- Counting Statistics
- Lifetime Measurement
- Background Radiation Sources
- Radiation Shielding
- Alpha, Beta, and Gamma

FREE DOWNLOAD

[vernier.com/nrv-e](http://vernier.com/nrv-e)



# Featured Products

Looking for Replacement Parts?

Visit [vernier.com/replacements](http://vernier.com/replacements)

## Go Direct Sensors

Sensor	Order Code	Price
Go Direct 3-Axis Magnetic Field	GDX-3MG	\$89
Go Direct Acceleration	GDX-ACC	\$114
Carts and Tracks		
Dynamics Cart and Track System with Go Direct Sensor Carts	DTS-GDX	\$619
Go Direct Sensor Cart (Green)	GDX-CART-G	\$199
Go Direct Sensor Cart (Yellow)	GDX-CART-Y	\$199
Go Direct Centripetal Force Apparatus	GDX-CFA	\$325
Go Direct Current	GDX-CUR	\$99
Go Direct Force and Acceleration	GDX-FOR	\$119
<b>NEW</b> Go Direct Force Plate	GDX-FP	\$399
Go Direct Gas Pressure	GDX-GP	\$99
Go Direct Light and Color	GDX-LC	\$99
Go Direct Motion	GDX-MD	\$124
Go Direct Photogate	GDX-VPG	\$95
Go Direct Projectile Launcher	GDX-PL	\$499
Go Direct Radiation Monitor	GDX-RAD	\$219
Go Direct Rotary Motion	GDX-RMS ⚡	\$189
Go Direct Sound	GDX-SND	\$98
Go Direct Static Charge	GDX-Q	\$109
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Voltage	GDX-VOLT	\$89

## Go Direct Charge Station

Sensor	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89

## LabQuest® Sensors

Sensor	Order Code	Price
Accelerometers		
3-Axis Accelerometer	3D-BTA	\$105
25-g Accelerometer	ACC-BTA	\$110
Low-g Accelerometer	LGA-BTA	\$99
Carts and Tracks		
Dynamics Cart and Track System with Motion Encoder	DTS-EC	\$529
Encoder Fan Cart	CART-FEC	\$245
Current Sensors		
Current Probe	DCP-BTA	\$49
High Current Sensor	HCS-BTA	\$89
Electricity and Magnetism Sensors		
Charge Sensor	CRG-BTA	\$89
Magnetic Field Sensor	MG-BTA	\$69
Force Sensors		
Dual-Range Force Sensor	DFS-BTA	\$120
Force Plate	FP-BTA	\$359
Gas Pressure Sensor	GPS-BTA	\$94
Light Sensors		
Diffraction Apparatus	DAK	\$669
Light Sensor	LS-BTA ⚡	\$69
Motion Detectors		
Go! Motion® (USB sensor)	GO-MOT	\$139
Motion Detector	MD-BTD	\$99
Photogate	VPG-BTD	\$55
Power Amplifier	PAMP	\$249
Projectiles		
Projectile Launcher	VPL	\$440
Time of Flight Pad	TOF-VPL	\$84

See all our products for physics at [vernier.com/physics](http://vernier.com/physics)

Radiation Monitor	VRM-BTD	\$199
Rotary Motion Sensor	RMV-BTD ⚡	\$189
Sound Sensors		
Microphone	MCA-BTA	\$55
Sound Level Sensor	SLS-BTA	\$69
Temperature Probes		
Stainless Steel Temperature Probe	TMP-BTA	\$43
Surface Temperature Sensor	STS-BTA	\$34
Voltage Probes		
30-Volt Voltage Probe	30V-BTA	\$59
Differential Voltage Probe	DVP-BTA	\$49
Instrumentation Amplifier	INA-BTA	\$89
Voltage Probe	VP-BTA	\$14

## Emissions Spectrometer

Spectrometer	Order Code	Price
Go Direct Emissions Spectrometer	GDX-SPEC-EM	\$950

## Infrared Cameras

Camera	URL
FLIR ONE® Thermal Cameras ⚡	<a href="http://vernier.com/flir">vernier.com/flir</a>

## Physics Lab Supplies

Part	Order Code	Price
<b>NEW</b> Cart Fan	DTS-CFAN	\$89
<b>NEW</b> Friction Block	PHY-FRBL	\$17
<b>NEW</b> Hanging Masses	PHY-HM250	\$23
<b>NEW</b> Meter Stick	PHY-METER	\$11
<b>NEW</b> Solenoid	PHY-SN700	\$79

HIGH SCHOOL

# Engineering and Coding

Encourage curiosity, build confidence, and spark an interest in STEM careers in your students. Vernier solutions give your students practical ways to learn engineering design principles and integrate sensor data into computer science concepts.

[vernier.com/engineering](http://vernier.com/engineering)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## PLTW Engineering and Computer Science

Project Lead The Way (PLTW) empowers students to develop in-demand, transportable knowledge and skills through programs in computer science, engineering, and biomedical science.

[vernier.com/pltw](http://vernier.com/pltw)

# PLTW

## Go Direct Structures & Materials Tester

Use our Go Direct® Structures & Materials Tester to evaluate the strength of model bridges and engineered structures by measuring the applied load. Utilizing both load and displacement sensors, your students can evaluate the properties of materials.

### Benefits

- Force and displacement sensors connect via Bluetooth® wireless technology or USB
- Uses Vernier Graphical Analysis® Pro app to collect and analyze data
- Exact force and displacement for bends and breaks
- Accurate positioning for center and off-center loading
- Free software simplifies bridge-building contests
- Includes *Materials Testing: Beams to Bridges* e-book

GDX-VSMT \$1,199

[vernier.com/gdx-vsmt](http://vernier.com/gdx-vsmt)



### Truss Tester Accessory

The Truss Tester Accessory attaches to the Go Direct Structures & Materials Tester, holds a single truss upright, and makes it possible for the load to be applied in a variety of locations.

VSMT-TRUSS \$149

[vernier.com/vsmt-truss](http://vernier.com/vsmt-truss)



### Go Direct Bridge Competition Software

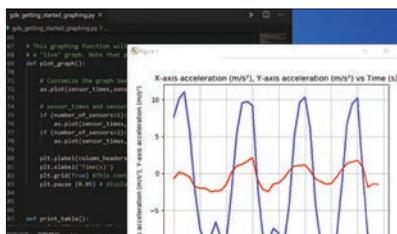
Make data collection easy and seamless for bridge-building competitions with our free Go Direct Bridge Competition Software. This software provides real-time graphing to give students immediate feedback on bridge performance and displays side-by-side comparisons for the entire class.

FREE DOWNLOAD

[vernier.com/godirect-bridge-competition-software](http://vernier.com/godirect-bridge-competition-software)

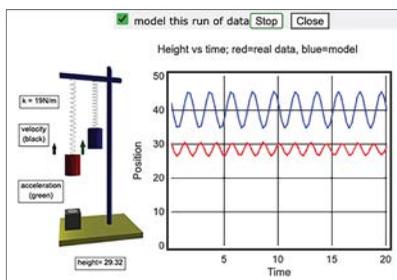


# Code with Python



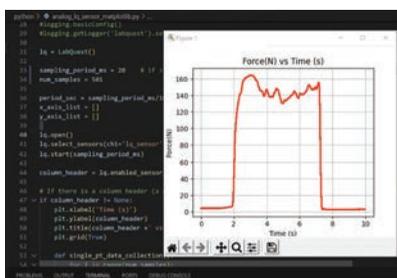
## Python with Go Direct Sensors

Create Python® code to capture data from Go Direct sensors. Supported on Windows® 10, macOS® and Linux (including Raspberry Pi®)



## Web VPython with Go Direct Sensors

Create 3D animations in a browser with Web VPython and Go Direct sensors. Both are compatible with a Chrome™ browser on Windows, macOS, Linux, and Chromebooks.



## Python with LabQuest Sensors

Communicate with your LabQuest sensors in Python. For LabQuest and Python, we offer support for Windows and macOS.

```

1.1 1.2 1.3 Boyle's Law
boyles_law.py 1/27
from Go_Direct import *
sensor = gdx()
the_p = []
the_v = []
reciprocals = []
samples = 6
for n in range(samples):
    while True:
        clear_history()
        print("pressure = {:.2f} kPa".format(sensor))
        print("Press [enter] to measure")

```

## Python with TI Calculators and Go Direct Sensors

Students can code beyond the screen of select TI calculators by integrating live sensor data into their Python programming language activities.

Available resources for using Python with Vernier sensors include a GitHub® repository, an introductory guide, and sample programs and activities.

[vernier.com/python](https://www.vernier.com/python)

For other coding solutions, including Scratch, JavaScript, and LabVIEW™, see [vernier.com/hs-engineering](https://www.vernier.com/hs-engineering)

# Code with Arduino

Combining Vernier LabQuest sensors with the inexpensive, easy-to-program Arduino® microcontrollers makes integrating coding and engineering into your curriculum simple and affordable.



[vernier.com/arduino](https://www.vernier.com/arduino)



# Practice Engineering Design with Renewable Energy

Challenge students to apply their knowledge as they explore the engineering design of wind turbines.

KidWind Advanced Wind Experiment Kit	KW-AWX	\$174
Go Direct Energy	GDX-NRG	\$98
KidWind Basic Building Parts	KW-BTPART	\$16
<i>Renewable Energy with Vernier</i>		
• Printed book + download:	REV	\$52
• Download only:	REV-E	\$44

[vernier.com/kidwind](https://www.vernier.com/kidwind)

HIGH SCHOOL

# Math

Confidence in math grows when students grasp its connection to everyday life. And now with enhanced compatibility between Vernier and Texas Instruments, students can explore math in tangible, real-world scenarios by wirelessly capturing and analyzing data on their TI calculator in real time.

[vernier.com/math](http://vernier.com/math)



## Wirelessly Connect TI Calculators with Vernier Sensors

Unlock the doors to a deeper understanding of mathematics through real-time data collection! This year, the TI-Nspire™ CX II and the TI-84 Plus CE Python will be able to connect wirelessly to select Vernier sensors using the TI Bluetooth® Adapter. This new compatibility allows for wireless connection between our most popular Go Direct® sensors and your calculator using the TI Bluetooth Adapter.



**TI Bluetooth Adapter**  
TI-CALC-BTADPT \$23

*\*TI calculators sold separately*

Sketch update  
available at  
[www.education.ti.com/tiblueooth](http://www.education.ti.com/tiblueooth)



**Available Spring 2024** Seamlessly connect your TI calculator to one of the following Go Direct Sensors using the Vernier DataQuest App and the TI Bluetooth Adapter.



Go Direct Temperature  
GDX-TMP \$78



Go Direct pH  
GDX-PH \$109



Go Direct Gas Pressure  
GDX-GP \$99



Go Direct Light  
and Color  
GDX-LC \$99



Go Direct Force  
and Acceleration  
GDX-FOR \$119



Go Direct Motion  
GDX-MD \$124

## Python Programming with TI and Vernier

Empower students to code their own data-collection programs with Python®! By downloading and transferring Python modules for Go Direct sensors to their TI graphing calculator, students can easily experiment with input and output controls using their collected data.

TI-Nspire CX II (TI-NSCX2)	TI-84 Plus CE Python (TI-84PCE)
Supports 6 Go Direct sensors	Supports 6 Go Direct sensors
Connects with 1 Go Direct sensor at a time	Connects with 1 Go Direct sensor at a time
Uses up to 4 sensor channels at a time (for sensors that have multiple sensor channels)	Uses 1 sensor channel at a time (for sensors that have multiple sensor channels)
Requires TI-Bluetooth Adapter	Requires TI-Bluetooth Adapter

Learn more about the TI Go Direct Python Module at [www.education.ti.com/go-direct](http://www.education.ti.com/go-direct)

## More Options to Collect Data with TI Calculators

Connect a Vernier sensor directly to any TI-Nspire handheld or TI-84 Plus graphing calculator and start collecting data. Collect data with the CBR 2 motion detector or EasyTemp® temperature probe, or use EasyLink® with a supported sensor to explore math and science concepts found in real-world phenomena such as light, pressure, force, and more.

Product	Order Code	Price	URL
 CBR2	CBR2	\$103	<a href="http://vernier.com/cbr2">vernier.com/cbr2</a>
 EasyLink	EZ-LINK	\$79	<a href="http://vernier.com/ez-link">vernier.com/ez-link</a>
 EasyTemp	EZ-TMP	\$48	<a href="http://vernier.com/ez-temp">vernier.com/ez-temp</a>

For other solutions, see [vernier.com/math](http://vernier.com/math)

## Calculator Products

For more information about compatibility, see our [website](#).

Product	Order Code	Price
<b>Books</b>	<i>Real-World Math with Vernier</i> (download only)	RWV-E \$44
	TI-84 Plus CE Python	TI-84PCE \$132
	TI-84 Plus CE Python Teacher Pack (10 EZ-Spot calculators & charging station)	TI-84PCE-TPK \$1,377
<b>Calculators</b>	TI-84 Plus Calculator	TI-84PL \$111
	TI-84 Plus EZ-Spot Teacher Pack (10 EZ-Spot calculators)	TI-84PL-TPK \$1,110
	TI-Nspire CX II Handheld	TI-NSCX2 \$139
	TI-Nspire CX II Teacher Pack (10 EZ-Spot handhelds & docking station)	TI-NSCX2-TPK \$1,512
	TI-Nspire CX II CAS Handheld	TI-NSCXCAS2 \$142
	TI-Nspire CX II CAS Teacher Pack (10 handhelds & docking station)	TI-NSCXCAS2-TPK \$1,542
	<b>Charging/ Docking Station</b>	TI-84 Plus CE Charging Station
	TI-Nspire CX Docking Station	TI-NSCX-DS \$130
<b>Data Collection</b>	CBL 2*	<a href="http://vernier.com/cbl2">vernier.com/cbl2</a>
	CBR 2	CBR2 \$103
	EasyLink	EZ-LINK \$79
	EasyTemp	EZ-TMP \$48
	TI Bluetooth Adapter	<a href="http://vernier.com/ti-bluetooth-adapter">vernier.com/ti-bluetooth-adapter</a>
<b>Emulator Software/ Online Calculators</b>	TI-SmartView™ Emulator software for TI-84	
	TI-84 Plus CE Online Calculator	
	TI-Nspire CX Online Calculator	<a href="http://vernier.com/ti-software">vernier.com/ti-software</a>
	TI-Nspire CX Student Software	
	TI-Nspire CX CAS Student Software	
	TI-Nspire CX Premium Teacher Software	
<b>Miscellaneous Accessories</b>	Easy to Go! USB Adapter	MINI-USB \$22
	Go! to Easy USB Adapter	USB-MINI⚡ \$9
<b>TI Navigator™ System</b>	30-User TI-Nspire CX Navigator System	TI-NAV-CX30 \$2,075
	10-User TI-Nspire CX Navigator System	TI-NAV-CX10 \$1,199
	10-User TI-Nspire CX Navigator Add-on†	TI-NAV-10ADDON \$775

TI products purchased in the United States are covered by a one-year warranty based on the date of purchase. Units are warranted against defective materials or workmanship.

\* Cannot be used with new TI-84 Plus, TI-84 Plus CE, or TI-Nspire handhelds

† Requires purchase of a Navigator system

⚡ For California Proposition 65 warning, see pp. 78–79.

# Middle School

Hands-on learning with technology is ideal for middle school students. Enhance their discovery and understanding of the world around them with the use of Vernier technology. Using our versatile, cutting-edge products and ready-to-go experiments correlated to the NGSS, you can encourage your students' curiosity and prepare them for high school—and the world beyond.

[vernier.com/middle-school](http://vernier.com/middle-school)



## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## Go Direct Temperature

MOST POPULAR

Students can use this rugged, general-purpose sensor to monitor temperature.

Range:  $-40$  to  $125^{\circ}\text{C}$

GDX-TMP \$78

[vernier.com/gdx-tmp](http://vernier.com/gdx-tmp)



## Go Direct Temperature Teacher Pack

GDX-TMP-TP \$692

Includes 8 Go Direct® Temperature Probes and a Go Direct Charge Station



## Go Direct Force and Acceleration

Measure forces as small as  $\pm 0.1$  N and up to  $\pm 50$  N with this sensor that couples a 3-axis accelerometer with a stable and accurate force sensor. Use it to measure pushes and pulls in the classroom or outdoors.

GDX-FOR \$119

[vernier.com/gdx-for](http://vernier.com/gdx-for)



## Go Direct Motion

Go Direct Motion uses ultrasound to measure the position, velocity, and acceleration of moving objects.

GDX-MD \$124

[vernier.com/gdx-md](http://vernier.com/gdx-md)



## Go Direct 3-Axis Magnetic Field

Determine the magnitude and direction of a magnetic field at any point in space with this 3-axis sensor.

GDX-3MG \$89

[vernier.com/gdx-3mg](http://vernier.com/gdx-3mg)



## Go Direct Gas Pressure

Go Direct Gas Pressure measures the absolute pressure of a gas.

GDX-GP \$99

[vernier.com/gdx-gp](http://vernier.com/gdx-gp)



## Go Direct pH

Go Direct pH is a general-purpose pH sensor used to monitor pH of aqueous solutions.

GDX-PH \$109

[vernier.com/gdx-ph](http://vernier.com/gdx-ph)



## Go Direct Light and Color

Go Direct Light and Color combines the power of multiple sensors to measure light intensity in the visible range and UV portions of the electromagnetic spectrum.

GDX-LC \$99

[vernier.com/gdx-lc](http://vernier.com/gdx-lc)



## Go Direct Voltage

Go Direct Voltage combines a wide input voltage range and high precision, making it an excellent choice for investigations of both AC/DC circuits and electromagnetism.

GDX-VOLT \$89

[vernier.com/gdx-volt](http://vernier.com/gdx-volt)



## Wind Energy Explorations

Students gain an understanding of energy, circuits, and loads, as well as practice engineering design as they use this e-book to explore wind energy.

MSB-WIND-E \$22 (e-book)

[vernier.com/msb-wind-e](http://vernier.com/msb-wind-e)



## Wind Energy Explorations Go Direct Packages

### Single Station Package (shown below)

This package includes

- Go Direct® Energy (1)
- Vernier Resistor Board (1)
- KidWind Basic Wind Experiment Kit

GDP-MS-WE \$251



Learn more at [vernier.com/gdp-ms-we](http://vernier.com/gdp-ms-we)

### Classroom Package

This package includes

- Go Direct Energy Sensors (3)
- Vernier Resistor Boards (3)
- KidWind Basic Wind Experiment Classroom Pack (includes materials for 6 to 10 groups of 2 to 4 students each)

GDP-MS-WEC \$705

## OpenSciEd

Vernier knows that science education is not static. Your students need to understand critical scientific concepts, use these concepts to solve problems, and understand how they connect to the real world. These objectives are incorporated into the main pillars of the three-dimensional learning framework developed by the National Research Council.

We are proud to partner with OpenSciEd™, a provider of high-quality, open-source science instructional materials. Our partnership gives you access to free field-tested and EQUIP-approved units that support the three-dimensional learning approach. Vernier provides free downloadable supplements that integrate data-collection technology into these units. When Vernier technology is paired with OpenSciEd's classroom-tested curriculum, your students establish a deep understanding of critical scientific concepts through data collection.

Learn more at [vernier.com/openscienced](http://vernier.com/openscienced)

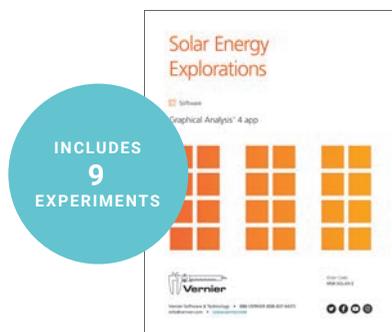


## Solar Energy Explorations

Solar energy provides a relevant topic for students to explore energy, temperature, and electrical circuits, culminating in an engineering design project.

MSB-SOLAR-E \$22 (e-book)

[vernier.com/msb-solar-e](http://vernier.com/msb-solar-e)



## Solar Energy Explorations Go Direct Package

This package includes sensors that work with Vernier Graphical Analysis® Pro and LabQuest® 3. It also includes an experiment kit and a resistor board.

- Go Direct Energy
- Solar Energy Exploration Kit
- Go Direct Surface Temperature
- Vernier Resistor Board

GDP-MS-SE \$305

Buy 8 or more packages at \$296 and save \$72.

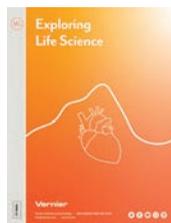


Learn more at [vernier.com/gdp-ms-se](http://vernier.com/gdp-ms-se)

## Exploring Life Science

From yeast to humans, this e-book provides opportunities for students to learn about life science.

Learn more at [vernier.com/msb-ls-e](http://vernier.com/msb-ls-e)



Download only  
MSB-LS-E \$12

## Exploring Life Science Go Direct Package

This package contains the following: Go Direct Gas Pressure, Go Wireless® Heart Rate, Go Direct Conductivity, and Gas Pressure Sensor Bulb.

GDP-MS-LS \$333

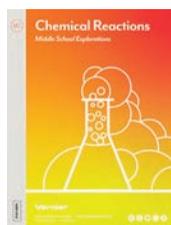
Buy 8 or more at \$323 and save \$80.



## Middle School Explorations: Chemical Reactions

In the six experiments in this book, students gain an understanding of various types of chemical reactions as they build a model to explain what goes on at the molecular level during a chemical reaction.

Learn more at [vernier.com/msb-cr-e](http://vernier.com/msb-cr-e)



Download only  
MSB-CR-E \$22

## Go Direct Temperature

This is a rugged, general-purpose sensor that students can use to monitor temperature.

GDX-TMP \$78

Teacher pack is also available (includes 8 Go Direct Temperature Probes and a Charge Station).

GDX-TMP-TP \$692



## Middle School Science Go Direct Package

This package includes 12 sensors that work with Vernier Graphical Analysis Pro and LabQuest 3.

- Go Direct Motion Detector
- Go Direct pH
- Go Direct Voltage
- Go Direct Temperature (2)
- Go Direct Light and Color
- Go Direct Force and Acceleration
- Go Direct Gas Pressure
- Go Wireless Heart Rate
- Go Direct Conductivity
- Go Direct 3-Axis Magnetic Field
- Gas Pressure Sensor Bulb

GDP-MS-DX \$1,118

Buy 8 Middle School Science Go Direct Packages at \$1,031 each and save \$272!

Learn more at [vernier.com/gdp-ms-dx](http://vernier.com/gdp-ms-dx)



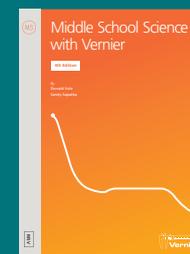
## Middle School Science with Vernier

The *Middle School Science with Vernier* lab book contains 38 experiments in Earth science, life science, and physical science written specifically for students in grades 6–8. Making use of 10 different Vernier sensors, your students will enjoy doing these well-tested science experiments.

Includes experiments from these e-books

- *Exploring Life Science*
- *Exploring Earth and Space Science*
- *Exploring Physical Science*

Learn more at [vernier.com/msv](http://vernier.com/msv)



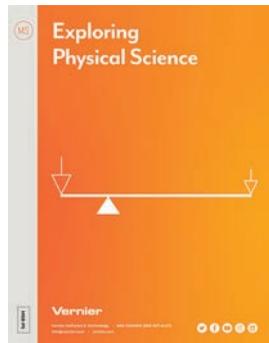
Printed book + download  
MSV \$52

Download only  
MSV-E \$44

## Exploring Physical Science

From matter and energy to motion and forces, students explore a wide variety of topics in basic chemistry and physics in this e-book.

Learn more at [vernier.com/msb-ps-e](http://vernier.com/msb-ps-e)



Download only  
MSB-PS-E \$22

### Exploring Physical Science Go Direct Package

This package contains the following Go Direct® sensors: Temperature (2), Gas Pressure, Force and Acceleration, Motion Detector, Voltage, 3-Axis Magnetic Field, and Light and Color.

GDP-MS-PS \$775

Buy 8 or more at \$752 and save \$184.



## Exploring Earth and Space Science

Weather, soil, and water quality are a few of the Earth science topics students explore in this e-book.

Learn more at [vernier.com/msb-ess-e](http://vernier.com/msb-ess-e)



Download only  
MSB-ESS-E \$22

### Exploring Earth and Space Science Go Direct Package

This package contains the following Go Direct sensors: Temperature (2), Light and Color, Motion Detector, Conductivity, and pH.

GDP-MS-ESS \$617

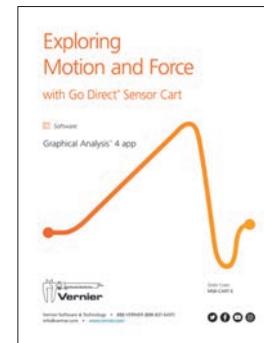
Buy 8 or more at \$598 and save \$152.



## Exploring Motion and Force with Go Direct Sensor Cart

In this e-book, students explore the force of friction, aspects of motion, and simple machines such as the lever, ramp, and pulley.

Learn more at [vernier.com/msb-cart-e](http://vernier.com/msb-cart-e)



Download only  
MSB-CART-E \$22

### Exploring Motion and Force with Go Direct Sensor Cart Package

This package contains the following Go Direct sensors: Sensor Cart (Green) and Sensor Cart (Yellow).

GDP-MS-SC \$398

Buy 8 or more at \$386 and save \$96.



# Featured Products

## Go Direct Sensors

Sensor	Order Code	Price
Go Direct 3-Axis Magnetic Field	GDX-3MG	\$89
Carts and Tracks		
Dynamics Cart and Track System with Go Direct Sensor Carts	DTS-GDX	\$619
Go Direct Sensor Cart (Green)	GDX-CART-G	\$199
Go Direct Sensor Cart (Yellow)	GDX-CART-Y	\$199
Go Direct Conductivity	GDX-CON	\$129
Go Direct Current	GDX-CUR	\$99
Go Direct Energy	GDX-NRG	\$98
Go Direct Force and Acceleration	GDX-FOR	\$119
Go Direct Gas Pressure	GDX-GP	\$99
Go Wireless® Heart Rate	GW-HR	\$98
Go Direct Light and Color	GDX-LC	\$99
Go Direct Motion	GDX-MD	\$124
Go Direct Optical Dissolved Oxygen	GDX-ODO	\$369
pH Sensors		
Go Direct pH	GDX-PH	\$109
Go Direct Tris-Compatible Flat pH	GDX-FPH	\$134
Go Direct Sound	GDX-SND	\$98
Go Direct Structures & Materials Tester	GDX-VSMT	\$1,199
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Voltage	GDX-VOLT	\$89
Go Direct Weather System	GDX-WTVA	\$158

## Go Direct Charge Station

Accessory	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89

## Additional Products

Products	Order Code	Price
Cart Guide (pkg. of 10) ⚡	CGUIDE-10	\$99
Davis® Weather Stations		<a href="http://vernier.com/weather">vernier.com/weather</a>
pH Storage Solution	PH-SS	\$25
KidWind Basic Wind Experiment Kit	KW-BWX	\$134
OHAUS® Balances ⚡		<a href="http://vernier.com/ohaus">vernier.com/ohaus</a>
Solar Energy Exploration Kit	KW-SEEK	\$89
Vernier Resistor Board	VES-RB	\$19

## Coding

Products	Order Code	Price
Go Direct Force and Acceleration (for use with Scratch)	GDX-FOR	\$119

[vernier.com/scratch](http://vernier.com/scratch)

## Lab Books

Title	Order Code	Price
<i>Middle School Science with Vernier</i>	Printed book + download: MSV	\$52
	Download only: MSV-E	\$44
<i>Exploring Motion and Force with Go Direct Sensor Cart</i>	MSB-CART-E	\$22
<i>Exploring Physical Science*</i>	MSB-PS-E	\$22
<i>Exploring Life Science*</i>	MSB-LS-E	\$12
<i>Exploring Earth and Space Science*</i>	MSB-ESS-E	\$22
<i>Solar Energy Explorations</i>	MSB-SOLAR-E	\$22
<i>Wind Energy Explorations</i>	MSB-WIND-E	\$22
<i>Earth Science with Vernier</i>	Printed book + download: ESV	\$52
	Download only: ESV-E	\$44
<i>Climate and Meteorology Experiments</i>	HSB-CM-E	\$22

\* All experiments from this e-book are included in Middle School Science with Vernier.

See all our products for middle school science at [vernier.com/middle-school](http://vernier.com/middle-school)

## LabQuest 3 Interface and Sensors

Learn more about LabQuest® 3 and sensors at [vernier.com/labq3](http://vernier.com/labq3)

## Looking for Replacement Parts?

Visit [vernier.com/replacements](http://vernier.com/replacements)

# Elementary School

Technology engages young students. Our carefully designed hands-on data-collection technology helps elementary school teachers introduce young learners to science and STEM. We've created easy-to-use resources to help you educate and inspire your students.

[vernier.com/elementary-school](http://vernier.com/elementary-school)

## Elementary Science Go Direct Package

This package includes 8 products that work with Vernier Graphical Analysis<sup>®</sup> Pro and LabQuest<sup>®</sup> 3.

- Go Direct<sup>®</sup> Temperature
- Go Direct Light and Color
- Go Direct Motion
- Go Direct 3-Axis Magnetic Field
- Go Direct Gas Pressure
- Go Direct Voltage
- Go Direct Force and Acceleration
- Gas Pressure Sensor Bulb

GDP-EL-DX \$704  
Buy 8 or more packages at \$683  
and save \$168.

Learn more at [vernier.com/gdp-el-dx](http://vernier.com/gdp-el-dx)



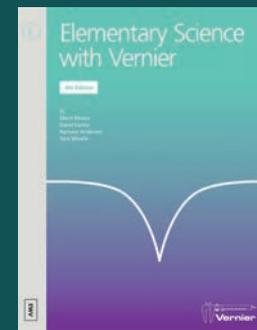
## Elementary Science with Vernier Lab Book

This collection of experiments for elementary students includes the topics of temperature, motion, force, magnetism, light, electricity, and gas pressure.

### Includes Experiments from These E-books

- *Investigating Temperature*
- *Investigating Gas Pressure*
- *Investigating Motion*
- *Investigating Force*
- *Investigating Light*
- *Investigating Magnetism*
- *Investigating Voltage*

Learn more at [vernier.com/ewv](http://vernier.com/ewv)



Printed book + download  
EWV \$52

Download only  
EWV-E \$44

## Professional Development

We are here to help. Our webinars, workshops, and personalized training options offer innovative ways to engage students with STEM in a traditional classroom or virtual environment.

[vernier.com/training](http://vernier.com/training)

## Investigating Wind Energy



**Printed book + download**  
ELB-WIND \$27

**Download only**  
ELB-WIND-E \$22

With the *Investigating Wind Energy* lab book, students conduct investigations to learn about energy transfer, basic electric circuits, and blade design.

### Investigating Wind Energy Package

Contains the following products

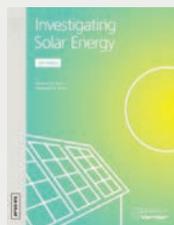
- Go Direct Energy
- Vernier Resistor Board
- KidWind MINI Wind Turbine with Blade Design

GDP-EL-WE \$186

Buy 8 or more at \$180 and save \$48.

[vernier.com/gdp-el-we](http://vernier.com/gdp-el-we)

## Investigating Solar Energy



**Printed book + download**  
ELB-SOLAR \$27

**Download only**  
ELB-SOLAR-E \$22

The *Investigating Solar Energy* lab book draws on solar energy as a real-world example through which to investigate energy transfer, series and parallel circuits, and other factors that affect solar panel output.

### Investigating Solar Energy Package

Contains the following products

- Go Direct Energy
- Go Direct Surface Temperature
- Solar Energy Exploration Kit
- Vernier Resistor Board

GDP-EL-SE \$305

Buy 8 or more at \$296 and save \$72.

[vernier.com/gdp-el-se](http://vernier.com/gdp-el-se)

# Featured Products

## Go Direct Sensors

Sensor		Order Code	Price
Go Direct 3-Axis Magnetic Field		GDX-3MG	\$89
Go Direct Energy		GDX-NRG	\$98
Go Direct Force and Acceleration		GDX-FOR	\$119
Go Direct Gas Pressure		GDX-GP	\$99
Go Direct Light and Color		GDX-LC	\$99
Go Direct Motion		GDX-MD	\$124
Go Direct Sound		GDX-SND	\$98
Go Direct Surface Temperature		GDX-ST	\$99
Go Direct Temperature		GDX-TMP	\$78
Go Direct Voltage		GDX-VOLT	\$89
Go Direct Weather		GDX-WTHR	\$129

## Go Direct Charge Station

Go Direct Charge Station		GDX-CRG	\$89
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## Coding

[vernier.com/scratch](http://vernier.com/scratch)

Go Direct Force and Acceleration (for use with Scratch)		GDX-FOR	\$119
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See all our products for elementary school science at [vernier.com/elementary-school](http://vernier.com/elementary-school)

# Sensors & Accessories

## The Vernier Sensor Advantage

### Outstanding Performance

With over 40 years of experience developing technology for education, we design our sensors for active, hands-on experiments. Vernier sensors are rugged, classroom-proven technology that are well supported and easy to use. The sensors provide consistent, high-quality results for the demands of the classroom.

### Connect & Collect

Simply connect, and you're ready to collect. All Vernier sensors on the following pages are automatically detected and set up for data collection when used with Vernier software.

### Go Direct Sensors

Our Go Direct® sensors connect directly to a computer, Chromebook™ or mobile device via Bluetooth® wireless technology or USB connection. Most sensors include a rechargeable battery to power the sensor when used wirelessly.

### LabQuest Sensors

Our LabQuest® sensors require an interface from the LabQuest family, such as LabQuest 3 or LabQuest Mini. The interface sends information from the sensor to the data-collection and analysis software on a device such as a computer, Chromebook, or mobile device.

For more information on sensor compatibility, visit [vernier.com/sensors](http://vernier.com/sensors)

### Generous Warranty

Buy with confidence. Most Vernier sensors are covered by a 5-year limited warranty. During the warranty period, Vernier will repair or replace the item if there is a defect in materials or workmanship. Outside the warranty, Vernier will attempt to repair most products, often at no charge.

## Go Direct Sensors

Sensor	Order Code	Price
Go Direct 3-Axis Magnetic Field	GDX-3MG	\$89
Go Direct Acceleration	GDX-ACC	\$114
Go Direct Blood Pressure	GDX-BP	\$125
Carts and Tracks		
Dynamics Cart and Track System with Go Direct Sensor Carts	DTS-GDX	\$619
Go Direct Sensor Cart (Green)	GDX-CART-G	\$199
Go Direct Sensor Cart (Yellow)	GDX-CART-Y	\$199
Go Direct Centripetal Force Apparatus (requires Go Direct Force and Acceleration)	GDX-CFA	\$325
Go Direct CO <sub>2</sub> Gas	GDX-CO2	\$225
Go Direct Colorimeter	GDX-COL	\$129
Conductivity Probes		
Go Direct Conductivity	GDX-CON	\$129
Go Direct Platinum-Cell Conductivity	GDX-CONPT	\$189
Go Direct Constant Current System	GDX-CCS	\$95
Go Direct Current	GDX-CUR	\$99
Go Direct Cyclic Voltammetry System	GDX-CVS	\$999
Go Direct Drop Counter	GDX-DC	\$109
Go Direct EKG	GDX-EKG	\$169
Go Direct Electrode Amplifier	GDX-EA	\$79
Go Direct Energy	GDX-NRG	\$98
Go Direct Ethanol Vapor	GDX-ETOH	\$169
Go Direct Force and Acceleration	GDX-FOR	\$119
<b>NEW</b> Go Direct Force Plate	GDX-FP	\$399
Gas Pressure Sensors		
Go Direct Gas Pressure	GDX-GP	\$99
Go Direct Wide-Range Pressure	GDX-WRP	\$219
Go Direct Wide-Range Pressure	GDX-WRPL	\$249
Go Direct Hand Dynamometer	GDX-HD	\$129
Heart Rate Monitors		
Go Wireless® Exercise Heart Rate	GW-EHR	\$79
Go Wireless Heart Rate	GW-HR	\$98

Go Direct Ion-Selective Electrode Amplifier	GDX-ISEA	\$79
Ion-Selective Electrodes (ISE)*		
Go Direct Ammonium ISE	GDX-NH4	\$289
Go Direct Calcium ISE	GDX-CA	\$289
Go Direct Chloride ISE	GDX-CL	\$289
Go Direct Nitrate ISE	GDX-NO3	\$289
Go Direct Potassium ISE	GDX-K	\$289
Go Direct Light and Color	GDX-LC	\$99
Go Direct Melt Station	GDX-MLT ⚠	\$599
Go Direct Mini GC	GDX-GC	\$3,599
Go Direct Motion	GDX-MD	\$124
Go Direct O <sub>2</sub> Gas	GDX-O2	\$209
Go Direct Optical Dissolved Oxygen	GDX-ODO	\$369
Go Direct ORP	GDX-ORP	\$119
<b>NEW</b> Go Direct PAR	GDX-PAR	\$299
pH Sensors		
Go Direct Glass-Body pH	GDX-GPH	\$159
Go Direct pH	GDX-PH	\$109
Go Direct Tris-Compatible Flat pH	GDX-FPH	\$134
Go Direct Photogate	GDX-VPG	\$95
Go Direct Polarimeter	GDX-POL	\$545
Go Direct Projectile Launcher	GDX-PL	\$499
<b>NEW</b> Go Direct Pyranometer	GDX-PYR	\$299
Go Direct Radiation Monitor	GDX-RAD	\$219
Go Direct Respiration Belt	GDX-RB	\$119
Go Direct Rotary Motion	GDX-RMS ⚠	\$189
<b>NEW</b> Go Direct Salinity	GDX-SAL	\$180
<b>NEW</b> Go Direct Soil Moisture	GDX-SM	\$149
Go Direct Sound	GDX-SND	\$98

\* Ion-Selective Electrodes require excellent chemical technique and careful calibration to obtain accurate results; they are not recommended for elementary or middle school students.

Spectrometers		
Go Direct Emissions Spectrometer	GDX-SPEC-EM	\$950
Go Direct Fluorescence/UV-VIS Spectrophotometer	GDX-SPEC-FUV	\$2,999
Go Direct SpectroVis® Plus	GDX-SVISPL	\$459
Go Direct UV-VIS Spectrophotometer	GDX-SPEC-UV	\$2,499
Go Direct Visible Spectrophotometer	GDX-SPEC-VIS	\$1,899
Go Direct Spirometer	GDX-SPR	\$219
Go Direct Static Charge	GDX-Q	\$109
Go Direct Structures & Materials Tester	GDX-VSMT	\$1,199
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Thermocouple	GDX-TC	\$118
Go Direct Wide-Range Temperature	GDX-WRT	\$139
Go Direct Voltage	GDX-VOLT	\$89
Go Direct Weather	GDX-WTHR	\$129

## LabQuest Sensors

Sensor	Order Code	Price
Accelerometers		
3-Axis Accelerometer	3D-BTA	\$105
25-g Accelerometer	ACC-BTA	\$110
Low-g Accelerometer	LGA-BTA	\$99
Anemometer	ANM-BTA	\$109
Barometer	BAR-BTA	\$79
Blood Pressure Sensor	BPS-BTA	\$120
Charge Sensor	CRG-BTA	\$89
CO <sub>2</sub> Gas Sensor	CO2-BTA	\$299
Colorimeter	COL-BTA	\$128
Conductivity Probes		
Conductivity Probe	CON-BTA	\$125
Platinum-Cell Conductivity Probe	CONPT-BTA	\$170
Constant Current System	CCS-BTA	\$79
Current Probes		
Current Probe	DCP-BTA	\$49
High Current Sensor	HCS-BTA	\$89
Diffraction Apparatus	DAK	\$669
Digital Control Unit	DCU-BTD	\$69

Drop Counter	VDC-BTD	\$109
EKG Sensor	EKG-BTA	\$179
Electrode Amplifier	EA-BTA	\$55
Energy Sensor	VES-BTA	\$99
Ethanol Sensor	ETH-BTA	\$135
Flow Rate Sensor	FLO-BTA	\$139
Force Sensors		
Dual-Range Force Sensor	DFS-BTA	\$120
Force Plate	FP-BTA	\$359
Gas Pressure Sensors		
Gas Pressure Sensor	GPS-BTA	\$94
Pressure Sensor 400	PS400-BTA	\$229
Goniometer	GNM-BTA ⚡	\$189
Hand Dynamometer	HD-BTA	\$124
Heart Rate Monitors		
Exercise Heart Rate Monitor	EHR-BTA	\$99
Hand-Grip Heart Rate Monitor	HGH-BTA	\$129
Instrumentation Amplifier	INA-BTA	\$89
Ion-Selective Electrodes (ISE)*		
Ammonium ISE	NH4-BTA	\$299
Calcium ISE	CA-BTA	\$299
Chloride ISE	CL-BTA	\$299
Nitrate ISE	NO3-BTA	\$299
Potassium ISE	K-BTA	\$299
Light Sensor	LS-BTA ⚡	\$69
Magnetic Field Sensor	MG-BTA	\$69
Melt Station	MLT-BTA ⚡	\$629
Microphone	MCA-BTA	\$55
Motion Detectors		
Dynamics Cart and Track System with Motion Encoder	DTS-EC	\$529
Motion Detector	MD-BTD	\$99
O <sub>2</sub> Gas Sensor	O2-BTA	\$210
ORP Sensor	ORP-BTA	\$115
PAR Sensor	PAR-BTA	\$259
pH Sensors		
Glass-Body pH Electrode BNC (requires Electrode Amplifier)	GPH-BNC	\$95
pH Sensor	PH-BTA	\$99

Tris-Compatible Flat pH Sensor	FPH-BTA	\$124
Photogate	VPG-BTD	\$55
Polarimeter (Chemical)	CHEM-POL ⚡	\$579
Power Amplifier	PAMP	\$249
Projectile Launcher	VPL	\$440
Pyranometer	PYR-BTA	\$279
Radiation Monitor	VRM-BTD	\$199
Relative Humidity Sensor	RH-BTA	\$79
Respiration Monitor Belt (requires Gas Pressure Sensor)	RMB	\$63
Rotary Motion Sensor	RMV-BTD ⚡	\$189
Salinity Sensor	SAL-BTA	\$149
Soil Moisture Sensor	SMS-BTA	\$139
Sound Level Sensor	SLS-BTA	\$69
Spirometer	SPR-BTA	\$240
Temperature Probes		
Extra-Long Temperature Probe	TPL-BTA	\$99
Stainless Steel Temperature Probe	TMP-BTA	\$43
Surface Temperature Sensor	STS-BTA	\$34
Thermocouple	TCA-BTA	\$79
Wide-Range Temperature Probe	WRT-BTA	\$119
Turbidity Sensor	TRB-BTA	\$124
UV Sensors		
UVA Sensor	UVA-BTA	\$118
UVB Sensor	UVB-BTA	\$119
Voltage Probes		
30-Volt Voltage Probe	30V-BTA	\$59
Differential Voltage Probe	DVP-BTA	\$49
Voltage Probe	VP-BTA	\$14

## USB-Only Sensors

Sensor	Order Code	Price
Go! Motion®	GO-MOT	\$139
Go!Temp®	GO-TEMP	\$49
OHAUS® Balances ⚡	vernier.com/ohaus	
Vernier Flash Photolysis Spectrometer	VSP-FP	\$5,999

⚡ For California Proposition 65 warning, see pp. 78–79.

# Accessories & Replacement Parts

## Sensors

Part Name	Order Code	Price
<b>Blood Pressure Sensors</b>		
Small Blood Pressure Cuff	CUFF-SM	\$35
Standard Blood Pressure Cuff	CUFF-STD	\$32
Large Blood Pressure Cuff	CUFF-LG	\$40
<b>CO<sub>2</sub> and/or O<sub>2</sub> Gas Sensors</b>		
250 mL Nalgene® Bottle (1 opening)	C02-BTL	\$5
BioChamber 250 (250 mL) (2 openings)	BC-250 ⚡	\$9
BioChamber 2000 (2000 mL) (2 openings)	BC-2000 ⚡	\$22
<b>Colorimeters</b>		
Cuvette Lids (pkg. of 100)	CUV-LID	\$9
Cuvette Rack	CUV-RACK	\$9
Plastic Cuvettes (Visible Range) (pkg. of 100)	CUV	\$24
<b>Conductivity Probes</b>		
Conductivity Low Standard (500 mL)	CON-LST	\$25
Conductivity Middle Standard (500 mL)	CON-MST	\$25
Conductivity High Standard (500 mL)	CON-HST	\$25
<b>Dissolved Oxygen Probe (Go Direct®, order code GDX-ODO)</b>		
Go Direct Optical Dissolved Oxygen Replacement Cap	GDX-ODO-CAP	\$79
Optical DO Probe Metal Guard	ODO-GRD	\$64
<b>Dissolved Oxygen Probe (Non-optical, order code DO-BTA)</b>		
DO Calibration Solution (60 mL)	DO-CAL	\$5
DO Filling Solution (130 mL)	FS	\$6
DO Polishing Strips	PS	\$4
DO Probe Membrane Cap	MEM	\$15
<b>Drop Counters</b>		
Microstirrer	MSTIR	\$9
Reagent Reservoir, 2 Valves, and Tip	VDC-RR	\$10
Stopper Stem	PS-STEM	\$1
Plastic 2-Way Valve	PS-2WAY	\$2
<b>EKG Sensors</b>		
EKG Electrodes (100)	ELEC	\$19
<b>Electrode Amplifier (Go Direct, order code GDX-EA)</b>		
Go Direct pH Electrode BNC	GDX-PH-BNC	\$50
Go Direct Glass-Body pH Electrode BNC	GDX-GPH-BNC	\$94
Go Direct Flat pH Electrode BNC	GDX-FPH-BNC	\$83
Go Direct ORP Electrode BNC	GDX-ORP-BNC	\$59

<b>Electrode Amplifier (LabQuest®, order code EA-BTA)</b>		
pH Electrode BNC	PH-BNC	\$68
Glass-Body pH Electrode BNC	GPH-BNC	\$95
Flat pH Electrode BNC	FPH-BNC	\$84
ORP Electrode BNC	ORP-BNC	\$62
<b>Energy Sensors</b>		
Vernier Resistor Board	VES-RB	\$19
Vernier Variable Load	VES-VL	\$74
<b>Ethanol Sensors</b>		
Ethanol Cap Assemblies (pkg. of 3)	ETH-CAPS	\$10
Ethanol Stopper	ETH-STOP	\$6
Ethanol Tape	ETH-TAPE	\$3
<b>Force Sensors</b>		
Reflex Hammer Accessory Kit	RFX-ACC	\$29
Replacement Accessory Rod	ACC-R0D	\$4
Springs Set	SPRINGS	\$18
Dual-Range Force Sensor Replacement Parts Kit	DFS-RPK	\$24
Bumper Launcher Kit	BLK	\$99
Hoop Bumpers for Bumper and Launcher Kit	H00PS-BLK	\$19
<b>Gas Chromatographs</b>		
GC Septa (pkg. of 4)	GC-SEP	\$34
GC Syringe, 1 µL Hamilton	GC-SYR-MIC	\$99
<b>Gas Pressure Sensors</b>		
Gas Pressure Sensor Bulb (1)	GPS-BULB1	\$7
Gas Pressure Sensor Bulb (set of 4)	GPS-BULB4	\$25
Pressure Sensor Accessories Kit	PS-ACC	\$12
#1 1-Hole Rubber Stopper	PS-ST0P1	\$1
#5 2-Hole Rubber Stopper	PS-ST0P5	\$1.50
Luer-Lock Connector	PS-LUER	\$1
Plastic 2-Way Valve	PS-2WAY	\$2
Plastic Tubing	PS-TUBING	\$1
Plastic Tubing Clamps (pkg. of 100)	PTC	\$49
Stopper Stem	PS-STEM	\$1
Syringe (20 mL, plastic)	PS-SYR	\$2
Syringe (20 mL, plastic) (pkg. of 10)	PS-SYR10	\$18
<b>Heart Rate Sensors</b>		
Heart Rate Hand Grips	HR-GRIP	\$41
Exercise Heart Rate Strap	HR-STRAP	\$21
Polar Transmitter Module	HR-TRANS	\$58

<b>Ion-Selective Electrodes</b>		
ISE Ammonium Replacement Module <sup>†</sup>	NH4-MOD	\$89
ISE Calcium Replacement Module <sup>†</sup>	CA-MOD	\$89
ISE Nitrate Replacement Module <sup>†</sup>	N03-MOD	\$89
ISE Potassium Replacement Module <sup>†</sup>	K-MOD	\$89
ISE Ammonium Low Standard (500 mL)	NH4-LST	\$25
ISE Ammonium High Standard (500 mL)	NH4-HST	\$25
ISE Calcium Low Standard (500 mL)	CA-LST	\$25
ISE Calcium High Standard (500 mL)	CA-HST	\$25
ISE Chloride Low Standard (500 mL)	CL-LST	\$25
ISE Chloride High Standard (500 mL)	CL-HST	\$25
ISE Nitrate Low Standard (500 mL)	N03-LST	\$25
ISE Nitrate High Standard (500 mL)	N03-HST	\$25
ISE Potassium Low Standard (500 mL)	K-LST	\$25
ISE Potassium High Standard (500 mL)	K-HST	\$25
<b>Melt Stations</b>		
Melt Station Capillary Tubes (pkg. of 100)	MLT-TUBE	\$24
<b>Motion Detectors</b>		
Go! Motion® to Computer Cable	GMC-USB	\$5
Motion Detector Cable	MDC-BTD	\$5
Motion Detector Clamp	MD-CLAMP	\$15
<b>pH and ORP Sensors</b>		
Microstirrer	MSTIR	\$9
pH Buffer Capsules (10 each of pH 4, 7, 10)	PH-BUFCAP	\$34
pH Storage Bottles (pkg. of 5)	BTL	\$10
pH Storage Solution (500 mL)	PH-SS	\$25
<b>Photogates</b>		
Cart Picket Fence	PF-CART	\$6
Go Direct Photogate Timing Cable	VPG-CB-GDX ⚡	\$8
Go Direct Time of Flight Pad Cable	TOF-CB-GDX ⚡	\$8
Laser Pointer	LASER	\$24
Laser Pointer Stand	STAND	\$29
Photogate Bar Tape Kit	TAPE-VPG ⚡	\$17
Picket Fence	PF	\$10
Pulley Bracket	B-SPA	\$12
Ultra Pulley Attachment	SPA	\$24
<b>Polarimeters (Chemical)</b>		
Polarimeter Sample Cells (pkg. of 4)	CELLS-POL	\$69

<sup>†</sup> ISE modules have a life expectancy of 1 to 2 years. We recommend that you do not purchase ISE replacement modules too far in advance of their expected time of use; degradation occurs while replacement modules are stored on the shelf.

Power Amplifier (order code PAMP)		
Accessory Speaker	PAAS-PAMP	\$155
Projectile Launchers		
Goggles (set of 2)	GGL-VPL	\$6
Time of Flight Pad	TOF-VPL	\$84
Steel Balls (set of 6)	STB-VPL	\$7
Projectile Stop	PS-VPL	\$40
Independence of Motion Accessory	IOM-VPL	\$59
Wax Tape (300 ft.)	WXT-VPL	\$18
Rotary Motion Sensors		
Rotational Motion Accessory Kit	AK-RMV	\$125
Rotary Motion Motor Kit	MK-RMV	\$12
Rotary Motion Sensor Replacement Pulley	RMV-PULLEY	\$5
Rotary Motion Sensor Replacement Parts Kit	RMV-RPK	\$25
Salinity Sensors		
Salinity Standard (500 mL)	SAL-ST	\$25
Spectrophotometers/Spectrometers		
Cuvette Lids (pkg. of 100)	CUV-LID	\$9
Cuvette Rack	CUV-RACK	\$9
Plastic Cuvettes (visible) (pkg. of 100)	CUV	\$24
Plastic Cuvettes (UV-VIS) (pkg. of 100)	CUV-UV	\$179
Quartz Cuvettes (pkg. of 2)	CUV-QUARTZ	\$299
Fluorescence/UV Quartz Cuvette (pkg. of 1)	CUV-QUARTZ-FUV	\$249
Spectrophotometer Optical Fiber (for GDX-SVISPL, GDX-SPEC-UV, GDX-SPEC-FUV)	VSP-FIBER	\$79
Vernier Emissions Fiber (for GDX-SPEC-EM, GDX-SPEC-VIS)	VSP-EM-FIBER	\$94
Spirometers		
Disposable Bacterial Filter (pkg. of 10)	SPR-FIL10	\$45
Disposable Bacterial Filter (pkg. of 30)	SPR-FIL30	\$129
Disposable Mouthpiece (pkg. of 30)	SPR-MP30	\$17
Disposable Mouthpiece (pkg. of 100)	SPR-MP100	\$39
Noseclip (pkg. of 10)	SPR-NOSE10	\$10
Noseclip (pkg. of 30)	SPR-NOSE30	\$25
O <sub>2</sub> Gas Sensor to Spirometer Adapter	O2-SPR	\$8
Structures & Materials Testers		
Truss Tester Accessory	VSMT-TRUSS	\$149
Turbidity Sensor (order code TRB-BTA)		
Turbidity Accessories Replacement Kit	TRB-ACC	\$39
Turbidity Bottles (pkg. of 6)	TRB-BOT	\$39
Voltage and Current Probes		
Inductor	IND	\$40
Large Capacitor	VCB2-CAP	\$30

Miniature Alligator Clips for Vernier Circuit Board	VCB-GATOR	\$15
Optional Breadboard Kit for the Vernier Circuit Board 2	VCB2-0BBK	\$29
Replacement Lamps for Vernier Circuit Board	VCB-BULB	\$12
Resistivity Rods	RRS	\$89
Vernier Circuit Board 2	VCB2	\$145

## Dynamics Cart and Track System

Part Name	Order Code	Price
For any Cart		
Cart Guide (pkg. of 10)	CGUIDE-10	\$99
For any Cart and Track System		
Adjustable Two Foot Leveler	AL-VDS	\$10
Adjustable End Stop	AS-VDS	\$8
Anti-Roll Pegs	VDS-ARP10	\$3
Axles and Wheels for Cart	WHEELS-VDS	\$15
Cart Picket Fence	PF-CART	\$6
Cart-Plunger Cart (plastic)	DTS-CART-P	\$84
Cart-Standard Cart (plastic)	DTS-CART-S	\$73
Motion Detector Bracket	DTS-MDB	\$11
Optics Accessories	page 55	
Photogate Bracket	PGB-VDS	\$5
Pulley Bracket	B-SPA	\$12
Vernier Dynamics System Replacement Parts Kit	VDS-RPK	\$29
For Dynamics Cart and Track Systems Only (Plastic Carts)		
Cart Fan	DTS-CFAN	\$89
DFS/Accelerometer Fasteners	DTS-ACC	\$9
Eddy Current Brake	DTS-ECB	\$19
Friction Pad DTS (for plastic carts)	DTS-PAD	\$32
Mass DTS (hexagonal bars)	DTS-MASS	\$16
Motion Detector Reflector Flag	DTS-FLAG	\$9
For Vernier Dynamics Systems Only (Metal Carts)		
Friction Pad (for metal carts)	PAD-VDS	\$35
Mass for Dynamics Carts (500 g block)	MASS	\$12

## BTA/BTD Cables & Adapters

Part Name	Order Code	Price
Analog Cables and Adapters		
Analog Bare Wire Cable	CB-BTA	\$5
Analog Breadboard Cable	BB-BTA	\$12
Analog Protoboard Adapter	BTA-ELV	\$12
Analog Sensor Extension Cable (2 m)	EXT-BTA	\$12

Digital Cables and Adapters		
Digital Bare Wire Cable	CB-BTD	\$5
Digital Breadboard Cable	BB-BTD	\$11
Digital Protoboard Adapter	BTD-ELV	\$12
Digital Sensor Extension Cable (2 m)	EXT-BTD	\$12

## LabQuest 3, LabQuest 2, and Original LabQuest

Part Name	Order Code	Price
LabQuest Battery Boost 3	LQ-BOOST3	\$119
LabQuest Charge Station	LQ3-CRG	\$149
LabQuest Power Supply	LQ3-PS	\$11
Vernier Mini USB Cable	CB-USB-MINI	\$5
Vernier USB Type C to Mini USB Cable	CB-USB-C-MINI	\$9
For LabQuest 3 Only		
LabQuest 3 Battery	LQ3-BAT	\$34
LabQuest 3 Lanyard	LQ3-LAN	\$9
LabQuest 3 Stand	LQ3-STN	\$5
For LabQuest 2 and Original LabQuest Only		
LabQuest Tether (pkg. of 5)	LQ-TETH-5	\$5
LabQuest Lanyard	LQ-LAN	\$5
LabQuest SD Card	LQ-SD	\$12
LabQuest Stylus (pkg. of 5)	LQ2-STYL-5	\$5
For LabQuest 2 Only		
LabQuest 2 Lab Armor	LQ2-ARMOR	\$15
LabQuest 2 Stand	LQ2-STN	\$5
LabQuest 2 Battery	LQ2-BAT	\$23
For Original LabQuest Only		
Original LabQuest Battery	LQ-BAT	\$19

## Go Direct

Part Name	Order Code	Price
Go Direct Charge Station	GDX-CRG	\$89
Go Direct Sensor Cart Charge Station	GDX-CART-CRG	\$149
Go Direct Sensor Clamp	GDX-CLAMP	\$14
Go Direct USB Radio	GDX-RADIO	\$35
<b>NEW</b> TI Bluetooth® Adapter (for use with select TI calculators)	TI-CALC-BTADPT	\$23
Vernier Micro USB Cable	CB-USB-MICRO	\$5
Vernier USB Type C to Micro USB Cable	CB-USB-C-MICRO	\$9

Additional Replacement Parts Available Online  
 Visit [vernier.com/replacements](https://www.vernier.com/replacements)

# Index

## A

Accelerometers  
3-Axis Accelerometer [vernier.com/3d-bta](http://vernier.com/3d-bta)  
25-g Accelerometer [vernier.com/acc-bta](http://vernier.com/acc-bta)  
Go Direct Acceleration 43  
Go Direct Force and Acceleration 43  
Low-g Accelerometer [vernier.com/lga-bta](http://vernier.com/lga-bta)  
Accessories and replacement parts 72–73  
*Advanced Biology with Vernier*  
[vernier.com/bio-a](http://vernier.com/bio-a)  
*Advanced Chemistry with Vernier*  
[vernier.com/chem-a](http://vernier.com/chem-a)  
*Advanced Physics with Vernier—Beyond Mechanics* 44  
*Advanced Physics with Vernier—Mechanics* 44  
*Agricultural Science with Vernier*  
[vernier.com/awv-e](http://vernier.com/awv-e)  
AirLink® Air Quality Monitor  
[vernier.com/dw-airlink](http://vernier.com/dw-airlink)  
Ammonium ion-selective electrodes  
Ammonium ISE [vernier.com/nh4-bta](http://vernier.com/nh4-bta)  
Go Direct Ammonium ISE  
[vernier.com/gdx-nh4](http://vernier.com/gdx-nh4)  
Anemometer [vernier.com/anm-bta](http://vernier.com/anm-bta)  
Arduino® products 59

## B

Balances [vernier.com/ohaus](http://vernier.com/ohaus)  
Barometer [vernier.com/bar-bta](http://vernier.com/bar-bta)  
BioChamber 250 [vernier.com/bc-250](http://vernier.com/bc-250)  
BioChamber 2000 [vernier.com/bc-2000](http://vernier.com/bc-2000)  
*Biology with Vernier* 21  
Bio-Rad® [vernier.com/bio-rad-kits](http://vernier.com/bio-rad-kits)  
Blood pressure sensors  
Blood Pressure Sensor  
[vernier.com/bps-bta](http://vernier.com/bps-bta)  
Go Direct Blood Pressure  
[vernier.com/gdx-bp](http://vernier.com/gdx-bp)  
BNC electrodes 72  
BlueView Transilluminator  
[vernier.com/blue-view](http://vernier.com/blue-view)  
Bumper and Launcher Kit 47

## C

Cables 73  
Calcium ion-selective electrodes  
Calcium ISE [vernier.com/ca-bta](http://vernier.com/ca-bta)  
Go Direct Calcium ISE  
[vernier.com/gdx-ca](http://vernier.com/gdx-ca)

Calculators [vernier.com/calculators](http://vernier.com/calculators)  
Calibration standards 73–74  
Canadian sales 77  
Cart Fan 3, 42, 47  
Cart Guide [vernier.com/cguide-10](http://vernier.com/cguide-10)  
CASE [vernier.com/partners](http://vernier.com/partners)  
CBL 2™ [vernier.com/cbl2](http://vernier.com/cbl2)  
CBR 2™ [vernier.com/cbr2](http://vernier.com/cbr2)  
Celestron® Digital Microscope Imagers  
[vernier.com/cs-5mp](http://vernier.com/cs-5mp)  
Centripetal force apparatus 51  
Charge sensors  
Charge Sensor [vernier.com/crg-bta](http://vernier.com/crg-bta)  
Go Direct Static Charge 52  
Charging stations  
Go Direct Charge Station  
[vernier.com/gdx-crg](http://vernier.com/gdx-crg)  
Go Direct Sensor Cart Charge Station  
[vernier.com/gdx-cart-crg](http://vernier.com/gdx-cart-crg)  
LabQuest Charge Station  
[vernier.com/lq3-crg](http://vernier.com/lq3-crg)  
TI-84 Plus CE Charging Station  
[vernier.com/ti-84pce-cs](http://vernier.com/ti-84pce-cs)  
TI-Nspire™ CX Docking Station  
[vernier.com/ti-nscx-ds](http://vernier.com/ti-nscx-ds)  
Chemical polarimeters  
Go Direct Polarimeter 36  
Polarimeter (Chemical)  
[vernier.com/chem-pol](http://vernier.com/chem-pol)  
*Chemistry with Vernier* 37  
Chloride ion-selective electrodes  
Chloride ISE [vernier.com/cl-bta](http://vernier.com/cl-bta)  
Go Direct Chloride ISE  
[vernier.com/gdx-cl](http://vernier.com/gdx-cl)  
*Climate and Meteorology Experiments* 32  
CO<sub>2</sub> gas sensors  
CO<sub>2</sub> Gas Sensor [vernier.com/co2-bta](http://vernier.com/co2-bta)  
Go Direct CO<sub>2</sub> Gas 18  
Coding 58–59, 61  
Color Mixer Kit [vernier.com/cm-oeK](http://vernier.com/cm-oeK)  
Colorimeters  
Colorimeter [vernier.com/col-bta](http://vernier.com/col-bta)  
Go Direct Colorimeter 35  
Conductivity probes  
Conductivity Probe  
[vernier.com/con-bta](http://vernier.com/con-bta)  
Go Direct Conductivity 19  
Go Direct Platinum-Cell Conductivity  
[vernier.com/gdx-conpt](http://vernier.com/gdx-conpt)  
Platinum-Cell Conductivity Probe  
[vernier.com/conpt-bta](http://vernier.com/conpt-bta)

Constant current systems  
Constant Current System  
[vernier.com/ccs-bta](http://vernier.com/ccs-bta)  
Go Direct Constant Current System 35  
Current sensors  
Current Probe [vernier.com/dcp-bta](http://vernier.com/dcp-bta)  
Go Direct Current 43, 52  
High Current Sensor  
[vernier.com/hcs-bta](http://vernier.com/hcs-bta)  
Cuvette Rack [vernier.com/cuv-rack](http://vernier.com/cuv-rack)  
Cuvettes 72–73

## D

Davis® weather stations [vernier.com/weather](http://vernier.com/weather)  
Differential Voltage Probe  
[vernier.com/dvp-bta](http://vernier.com/dvp-bta)  
Diffraction Apparatus 55  
Digital microscopes  
[vernier.com/digital-microscopes](http://vernier.com/digital-microscopes)  
Drop counters  
Drop Counter [vernier.com/vdc-btd](http://vernier.com/vdc-btd)  
Go Direct Drop Counter 35  
Dual-Range Force Sensor [vernier.com/dfs-bta](http://vernier.com/dfs-bta)  
Dynamics system accessories 47  
Dynamics systems 46–47

## E

*Earth Science with Vernier* 32  
EasyLink [vernier.com/ez-link](http://vernier.com/ez-link)  
EasyTemp [vernier.com/ez-tmp](http://vernier.com/ez-tmp)  
Eddy Current Brake 47  
EKG electrodes 72  
EKG sensors  
EKG Sensor [vernier.com/ekg-bta](http://vernier.com/ekg-bta)  
Go Direct EKG 19  
Electrode amplifiers  
Electrode Amplifier  
[vernier.com/ea-bta](http://vernier.com/ea-bta)  
Go Direct Electrode Amplifier  
[vernier.com/gdx-ea](http://vernier.com/gdx-ea)  
Ion-Selective Electrode Amplifier  
[vernier.com/gdx-isea](http://vernier.com/gdx-isea)  
Electrode Support [vernier.com/esup](http://vernier.com/esup)  
Electronic lab books (e-books) 17  
Electrostatic High-Voltage Genecon  
[vernier.com/hvek-gen](http://vernier.com/hvek-gen)  
Electrostatics kit 52  
*Elementary Science with Vernier* 68  
ELVIS protoboard adapters  
[vernier.com/protoboard-adapters](http://vernier.com/protoboard-adapters)

Emissions spectrometer 56  
Energy sensors  
Energy Sensor [vernier.com/ves-bta](http://vernier.com/ves-bta)  
Go Direct Energy 26  
*Engineering Projects with NI LabVIEW™ and Vernier* [vernier.com/epv-e](http://vernier.com/epv-e)  
Equipment return 77  
Ethanol sensors  
Ethanol Sensor [vernier.com/eth-bta](http://vernier.com/eth-bta)  
Go Direct Ethanol Vapor  
[vernier.com/gdx-eth](http://vernier.com/gdx-eth)  
Exercise heart rate monitors  
Exercise Heart Rate Monitor  
[vernier.com/ehr-bta](http://vernier.com/ehr-bta)  
Go Wireless Exercise Heart Rate  
[vernier.com/gw-ehr](http://vernier.com/gw-ehr)  
*Exploring Earth and Space Science* 66  
*Exploring Life Science* 65  
*Exploring Motion and Force with Go Direct Sensor Cart* 86  
*Exploring Physical Science* 66  
Extex® Digital Power Supply 52  
Extra-Long Temperature Probe  
[vernier.com/tpl-bta](http://vernier.com/tpl-bta)

## F

Fan carts  
Cart Fan 3, 42, 47  
Encoder Fan Cart [vernier.com/cart-fec](http://vernier.com/cart-fec)  
Fan Cart [vernier.com/cart-f](http://vernier.com/cart-f)  
FLIR ONE® thermal cameras 53  
Flow Rate Sensor [vernier.com/flo-bta](http://vernier.com/flo-bta)  
Flourescence Spectrometers  
Go Direct Fluorescence/UV-VIS  
Spectrophotometer  
[vernier.com/gdx-spec-fuv](http://vernier.com/gdx-spec-fuv)  
Go Direct SpectoVis Plus 21, 37  
*Food Chemistry Experiments*  
[vernier.com/hsb-food](http://vernier.com/hsb-food)  
Force sensors  
Dual-Range Force Sensor  
[vernier.com/dfs-bta](http://vernier.com/dfs-bta)  
Force Plate [vernier.com/fp-bta](http://vernier.com/fp-bta)  
Go Direct Force Plate 49  
*Forensics Chemistry Experiments* 2, 36  
*Forensics with Vernier* [vernier.com/fwv](http://vernier.com/fwv)  
Frequency Generator 54  
Friction Pad 47

## G

Gas chromatograph 36  
Gas pressure sensors  
  Gas Pressure Sensor [vernier.com/gps-bta](http://vernier.com/gps-bta)  
  Go Direct Gas Pressure 19  
  Go Direct Wide-Range Pressure  
    [vernier.com/gdx-wrp](http://vernier.com/gdx-wrp)  
  Pressure Sensor 400  
    [vernier.com/ps400-bta](http://vernier.com/ps400-bta)  
Glass-Body pH Electrode BNC  
  [vernier.com/gph-bnc](http://vernier.com/gph-bnc)  
Go Direct Bridge Competition Software 58  
Go Direct Centripetal Force System 51  
Go Direct Rotary Motion Package 50  
Go Direct Sensor Cart Charge Station  
  [vernier.com/gdx-cart-crg](http://vernier.com/gdx-cart-crg)  
Go Direct Sensor Clamp 27  
Go Direct Weather System 20, 25, 32  
Go! Link 15  
Goniometer [vernier.com/gnm-bta](http://vernier.com/gnm-bta)  
Grants 1  
Graphical Analysis Pro app 8–9, 44  
Green Diffraction Laser 55

## H

Hand dynamometers  
  Go Direct Hand Dynamometer 20  
  Hand Dynamometer  
    [vernier.com/hd-bta](http://vernier.com/hd-bta)  
Heart rate monitors  
  Exercise Heart Rate Monitor  
    [vernier.com/ehr-bta](http://vernier.com/ehr-bta)  
  Go Wireless Exercise Heart Rate  
    [vernier.com/gw-ehr](http://vernier.com/gw-ehr)  
  Go Wireless Heart Rate  
    [vernier.com/gw-hr](http://vernier.com/gw-hr)  
  Hand-Grip Heart Rate Monitor  
    [vernier.com/hgh-bta](http://vernier.com/hgh-bta)  
High Current Sensor [vernier.com/hcs-bta](http://vernier.com/hcs-bta)  
High-Voltage Electrostatics Kit  
  [vernier.com/hvek-crg](http://vernier.com/hvek-crg)  
*Human Physiology Experiments: Volume 1*  
  [vernier.com/hsb-hp](http://vernier.com/hsb-hp)  
*Human Physiology Experiments: Volume 2* 20  
*Human Physiology with Vernier*  
  [vernier.com/hp-a](http://vernier.com/hp-a)

## I

Independence of Motion Accessory 50  
Infrared cameras 50  
Instrumental Analysis app 11  
Instrumentation Amplifier  
  [vernier.com/ina-bta](http://vernier.com/ina-bta)  
Interfaces for LabQuest sensors  
  Arduino Interface Shield  
    [vernier.com/bt-ard](http://vernier.com/bt-ard)  
  CBL 2 [vernier.com/cbl2](http://vernier.com/cbl2)

EasyLink [vernier.com/ez-link](http://vernier.com/ez-link)  
Go! Link 15  
LabQuest 3 12  
LabQuest Mini 15  
TI Bluetooth® Adapter 60  
International sales 77  
*Investigating Biology through Inquiry*  
  [vernier.com/bio-i](http://vernier.com/bio-i)  
*Investigating Chemistry through Inquiry*  
  [vernier.com/chem-i](http://vernier.com/chem-i)  
*Investigating Environmental Science through Inquiry* 27  
*Investigating Force* [vernier.com/elb-for-e](http://vernier.com/elb-for-e)  
*Investigating Gas Pressure* [vernier.com/elb-gp-e](http://vernier.com/elb-gp-e)  
*Investigating Light* [vernier.com/elb-lc-e](http://vernier.com/elb-lc-e)  
*Investigating Magnetism* [vernier.com/elb-3mg-e](http://vernier.com/elb-3mg-e)  
*Investigating Motion* [vernier.com/elb-md-e](http://vernier.com/elb-md-e)  
*Investigating Solar Energy* 69  
*Investigating Temperature* [vernier.com/elb-temp](http://vernier.com/elb-temp)  
*Investigating Voltage* [vernier.com/elb-volt-e](http://vernier.com/elb-volt-e)  
*Investigating Wind Energy* 69  
Ion-Selective Electrodes (ISE)  
  [vernier.com/ise](http://vernier.com/ise)  
ISE standards 72

## J

JavaScript™ [vernier.com/javascript](http://vernier.com/javascript)

## K

KidWind Challenges  
  [vernier.com/kidwind-challenges](http://vernier.com/kidwind-challenges)  
KidWind products 26

## L

LabQuest 3 12–14, 20, 27  
LabQuest accessories 14, 73  
LabQuest Mini 15  
LabQuest Viewer 14  
LabVIEW [vernier.com/labview](http://vernier.com/labview)  
Light sensors  
  Go Direct Light and Color 2, 5, 31, 41, 55, 63  
  Light Sensor 55

## M

Magnetic field sensors  
  Go Direct 3-Axis Magnetic Field 30, 43, 52, 63  
  Magnetic Field Sensor  
    [vernier.com/mg-bta](http://vernier.com/mg-bta)  
*Materials Testing: Beams to Bridges with Go Direct VSMT* [vernier.com/gdxvsmt-bb-e](http://vernier.com/gdxvsmt-bb-e)  
Melt stations  
  Go Direct Melt Station 36  
  Melt Station [vernier.com/mlt-bta](http://vernier.com/mlt-bta)  
Microscopes (Digital)  
  [vernier.com/digital-microscopes](http://vernier.com/digital-microscopes)

Microphone sensors  
  Go Direct Sound 54  
  Microphone 54  
*Middle School Explorations: Chemical Reactions* 65  
*Middle School Science with Vernier* 65  
Mini GC 36  
Mirror Set [vernier.com/m-oek](http://vernier.com/m-oek)  
Moment of Inertia Kit 51  
Motion detectors  
  CBR 2 [vernier.com/cbr2](http://vernier.com/cbr2)  
  Go Direct Motion 31, 43, 48, 63  
  Go! Motion [vernier.com/go-mot](http://vernier.com/go-mot)  
  Motion Detector [vernier.com/md-btd](http://vernier.com/md-btd)  
Motion Encoder  
  Cart and Receiver 47  
  Dynamics cart and track systems 46–47  
  Fan Cart [vernier.com/cart-fec](http://vernier.com/cart-fec)  
Motor Accessory Kit 51  
MyDAQ Adapter [vernier.com/bt-mdaq](http://vernier.com/bt-mdaq)

## N

Nitrate ion-selective electrodes  
  Go Direct Nitrate ISE  
    [vernier.com/gdx-no3](http://vernier.com/gdx-no3)  
  Nitrate ISE [vernier.com/no3-bta](http://vernier.com/no3-bta)  
*Nuclear Radiation with Vernier* 56

## O

O<sub>2</sub> gas sensors  
  Go Direct O<sub>2</sub> Gas 18  
  O<sub>2</sub> Gas Sensor [vernier.com/o2-bta](http://vernier.com/o2-bta)  
OHAUS® balances [vernier.com/ohaus](http://vernier.com/ohaus)  
OpenSciEd™ 64  
Optical DO probes  
  Go Direct Optical Dissolved Oxygen 19, 24  
Optical fibers 73  
Optics accessories 55  
*Organic Chemistry with Vernier*  
  [vernier.com/chem-o](http://vernier.com/chem-o)  
ORP sensors  
  Go Direct ORP 35  
  ORP Sensor [vernier.com/orp-bta](http://vernier.com/orp-bta)

## P

Packages [vernier.com/packages](http://vernier.com/packages)  
  Elementary packages 68–69  
  Middle school packages 64–66  
  High school packages 20, 21, 27, 32, 37, 45  
PAR Sensors  
  Go Direct PAR 3, 20  
  PAR Sensor [vernier.com/par-bta](http://vernier.com/par-bta)  
pH Buffer Capsules 72  
pH sensors  
  Glass-Body pH Electrode BNC  
    [vernier.com/gph-bnc](http://vernier.com/gph-bnc)  
  Go Direct Glass-Body pH  
    [vernier.com/gdx-gph](http://vernier.com/gdx-gph)

Go Direct pH 19, 31, 34, 41, 63  
Go Direct Tris-Compatible Flat pH 25  
pH Sensor [vernier.com/ph-bta](http://vernier.com/ph-bta)  
Tris-Compatible Flat pH Sensor  
  [vernier.com/fph-bta](http://vernier.com/fph-bta)  
pH Storage Solution 72  
Photogates  
  Go Direct Photogate 43, 48  
  Photogate [vernier.com/vpg-btd](http://vernier.com/vpg-btd)  
*Physical Science with Vernier* 41  
*Physics Explorations and Projects* 45  
*Physics with Vernier* 45  
*Physics with Video Analysis* [vernier.com/pva-e](http://vernier.com/pva-e)  
Picket Fence 48  
Platinum-Cell Conductivity Probe  
  [vernier.com/conpt-bta](http://vernier.com/conpt-bta)  
PLTW 58  
Polarimeters (Chemical)  
  Go Direct Polarimeter 36  
  Polarimeter (Chemical)  
    [vernier.com/chem-pol](http://vernier.com/chem-pol)  
Polarizer/Analyzer Set [vernier.com/pak-oek](http://vernier.com/pak-oek)  
Potassium ion-selective electrodes  
  Go Direct Potassium ISE  
    [vernier.com/gdx-k](http://vernier.com/gdx-k)  
  Potassium ISE [vernier.com/k-bta](http://vernier.com/k-bta)  
Power Amplifier 52, 54  
Power Amplifier Accessory Speaker 54  
Pressure sensors  
  Gas Pressure Sensor [vernier.com/gps-bta](http://vernier.com/gps-bta)  
  Go Direct Gas Pressure 19, 35, 63  
  Go Direct Wide-Range Pressure  
    [vernier.com/gdx-wrp](http://vernier.com/gdx-wrp)  
  Pressure Sensor 400  
    [vernier.com/ps400-bta](http://vernier.com/ps400-bta)  
Primary Productivity Kit [vernier.com/ppk](http://vernier.com/ppk)  
Professional development  
  [vernier.com/training](http://vernier.com/training)  
Projectile launchers  
  Go Direct Projectile Launcher 50  
  Projectile Launcher [vernier.com/vpl](http://vernier.com/vpl)  
Prop 65 (California) 78–79  
ProtoBoard adapters  
  [vernier.com/protoboard-adapters](http://vernier.com/protoboard-adapters)  
Pyranometers  
  Go Direct Pyranometer 3  
  Pyranometer [vernier.com/pyr-bta](http://vernier.com/pyr-bta)  
Python® 59, 61

## Q

Qubit Systems sensors [vernier.com/qubit](http://vernier.com/qubit)

## R

Radiation monitors  
  Go Direct Radiation Monitor 56  
  Vernier Radiation Monitor 56  
Raspberry Pi® 59  
*Real-World Math with Vernier* [vernier.com/rww-e](http://vernier.com/rww-e)

Reflex Hammer Accessory Kit  
[vernier.com/rfx-acc](http://vernier.com/rfx-acc)  
 Relative Humidity Sensor [vernier.com/rh-bta](http://vernier.com/rh-bta)  
 Renewable energy products  
[vernier.com/renewable-energy](http://vernier.com/renewable-energy)  
*Renewable Energy with Vernier* 26  
 Resonance Apparatus 2, 54  
 Respiration monitors  
   Go Direct Respiration Belt 19  
   Respiration Monitor Belt [vernier.com/rmb](http://vernier.com/rmb)  
 Returns 77  
 Rotary motion sensors  
   Go Direct Rotary Motion 50  
   Rotary Motion Sensor [vernier.com/rmv-btd](http://vernier.com/rmv-btd)  
 Rotary Motion Motor Kit [vernier.com/mk-rmv](http://vernier.com/mk-rmv)  
 Rotational Motion Accessory Kit 50

## S

Salinity sensors  
   Go Direct Salinity 3, 25  
   Salinity Sensor [vernier.com/sal-bta](http://vernier.com/sal-bta)  
 Scratch [vernier.com/scratch](http://vernier.com/scratch)  
*Sensor Cart Physics* 45  
 Sensor carts 40, 48  
 Software  
   Go Direct Bridge Building Competition  
     Software 58  
   Graphical Analysis Pro app 8–9, 44  
   Instrumental Analysis app 11  
   LabQuest App 13  
   LabQuest Viewer 14  
   Logger Pro 3 [vernier.com/lp](http://vernier.com/lp)  
   Spectral Analysis app 11, 37, 56  
   Texas Instruments software  
     [vernier.com/ti-software](http://vernier.com/ti-software)  
   Thermal Analysis Plus app  
     [vernier.com/thermal-analysis](http://vernier.com/thermal-analysis)  
   Video Analysis app 10, 44  
 Software license policy 77  
 Soil moisture sensors  
   Go Direct Soil Moisture 3, 20, 24  
   Soil Moisture Sensor [vernier.com/sms-bta](http://vernier.com/sms-bta)  
 Solar Energy Exploration Kit 26, 64  
*Solar Energy Explorations* 64  
 Solar Thermal Explorations Kit [vernier.com/stxk](http://vernier.com/stxk)  
 Sound level sensors  
   Go Direct Sound 54  
   Sound Level Sensor 54  
 SparkFun® RedBoard [vernier.com/ard-red](http://vernier.com/ard-red)  
 Spectral Analysis app 11, 37, 56  
 Spectrometers/Spectrophotometers  
   Go Direct Emissions Spectrometer 56  
   Go Direct Fluorescence/UV-VIS  
     Spectrophotometer  
       [vernier.com/gdx-spec-fuv](http://vernier.com/gdx-spec-fuv)  
   Go Direct SpectroVis Plus 21, 37  
   Go Direct UV-VIS Spectrophotometer  
     [vernier.com/gdx-spec-uv](http://vernier.com/gdx-spec-uv)

Go Direct Visible Spectrophotometer  
[vernier.com/gdx-spec-vis](http://vernier.com/gdx-spec-vis)  
 Vernier Flash Photolysis Spectrometer  
[vernier.com/vsp-fp](http://vernier.com/vsp-fp)  
 Spectrum Tube Power Supply 56  
 Spectrum Tubes 56  
 Spirometer accessories 73  
 Spirometers  
   Go Direct Spirometer [vernier.com/gdx-spr](http://vernier.com/gdx-spr)  
   Spirometer [vernier.com/spr-bta](http://vernier.com/spr-bta)  
 Stainless Steel Temperature Probe  
[vernier.com/tmp-bta](http://vernier.com/tmp-bta)  
 Static Genecon [vernier.com/hvek-gen](http://vernier.com/hvek-gen)  
 Stir Station 36  
 Structures and Material Tester 58  
 Surface Temperature Sensors  
   Go Direct Surface Temperature 58  
   Surface Temperature Sensor  
     [vernier.com/sts-bta](http://vernier.com/sts-bta)

## T

Technical support 77  
 Temperature probes  
   EasyTemp [vernier.com/ez-temp](http://vernier.com/ez-temp)  
   Extra-Long Temperature Probe  
     [vernier.com/tpl-bta](http://vernier.com/tpl-bta)  
   Go!Temp [vernier.com/go-temp](http://vernier.com/go-temp)  
   Go Direct Surface Temperature 25, 32  
   Go Direct Temperature 30, 34, 40, 62  
   Go Direct Thermocouple  
     [vernier.com/gdx-tc](http://vernier.com/gdx-tc)  
   Go Direct Wide-Range Temperature 36  
   Stainless Steel Temperature Probe  
     [vernier.com/tmp-bta](http://vernier.com/tmp-bta)  
   Surface Temperature Sensor  
     [vernier.com/sts-bta](http://vernier.com/sts-bta)  
   Thermocouple [vernier.com/tca-bta](http://vernier.com/tca-bta)  
   Wide-Range Temperature Probe  
     [vernier.com/wrt-bta](http://vernier.com/wrt-bta)  
 Texas Instruments products 60–61  
 Thermal Analysis Plus app  
[vernier.com/thermal-analysis](http://vernier.com/thermal-analysis)  
 Thermocouples  
   Go Direct Thermocouple  
     [vernier.com/gdx-tc](http://vernier.com/gdx-tc)  
   Thermocouple [vernier.com/tca-bta](http://vernier.com/tca-bta)  
 Time of Flight Pad 50  
 Track/optics bench 55  
 Transilluminator [vernier.com/blue-view](http://vernier.com/blue-view)  
 Tris-Compatible pH sensors  
   Go Direct Tris-Compatible Flat pH 25  
   Tris-Compatible Flat pH Sensor  
     [vernier.com/fph-bta](http://vernier.com/fph-bta)  
 Truss Tester Accessory 58  
 Turbidity Sensor [vernier.com/trb-bta](http://vernier.com/trb-bta)

## U

Ultra Pulley Attachment 48  
 Ultraviolet light sensors  
   Go Direct Light and Color 21, 31, 41, 55, 63  
   UVA Sensor [vernier.com/uva-bta](http://vernier.com/uva-bta)  
   UVB Sensor [vernier.com/uvb-bta](http://vernier.com/uvb-bta)  
 USB cables 73  
 USB digital microscopes  
[vernier.com/digital-microscopes](http://vernier.com/digital-microscopes)  
 UV/VIS spectrophotometers  
   Go Direct Fluorescence/UV-VIS  
     Spectrophotometer  
       [vernier.com/gdx-spec-fuv](http://vernier.com/gdx-spec-fuv)  
   Go Direct UV-VIS Spectrophotometer  
     [vernier.com/gdx-spec-uv](http://vernier.com/gdx-spec-uv)  
 Spectrophotometer  
[vernier.com/gdx-spec-uv](http://vernier.com/gdx-spec-uv)

## V

Vernier Arduino Interface Shield  
[vernier.com/bt-ard](http://vernier.com/bt-ard)  
*Vernier Coding Activities with Arduino: Analog  
 Sensors* [vernier.com/vca-as-e](http://vernier.com/vca-as-e)  
*Vernier Chemistry Investigations for Use with  
 AP\* Chemistry* [vernier.com/apchem](http://vernier.com/apchem)  
 Vernier Circuit Board 2 52  
   Optional Breadboard Kit  
     [vernier.com/vcb2-obbk](http://vernier.com/vcb2-obbk)  
 Vernier Connections 4–5  
 Vernier dynamics cart and track systems  
 46–47  
 Vernier Emission Fiber 73  
 Vernier Energy Sensor [vernier.com/ves-bta](http://vernier.com/ves-bta)  
 Vernier Flash Photolysis Spectrometer  
[vernier.com/vsp-fp](http://vernier.com/vsp-fp)  
 Vernier Radiation Monitor 56  
 Vernier Resistor Board [vernier.com/ves-rb](http://vernier.com/ves-rb)  
 Vernier Spectrometer Optical Fiber 73  
 Vernier Variable Load [vernier.com/ves-vl](http://vernier.com/ves-vl)  
*Vernier Video Analysis: Conservation Laws and  
 Forces* 10, 44  
*Vernier Video Analysis: Motion and Sports* 10, 44  
 Video Analysis app 10, 44  
 Voltage probes  
   30-Volt Voltage Probe [vernier.com/30v-bta](http://vernier.com/30v-bta)  
   Differential Voltage Probe  
     [vernier.com/dvp-bta](http://vernier.com/dvp-bta)  
   Go Direct Voltage 43, 52, 63  
   Instrumentation Amplifier  
     [vernier.com/ina-bta](http://vernier.com/ina-bta)  
   Voltage Probe [vernier.com/vp-bta](http://vernier.com/vp-bta)  
 VPython 59

## W

Warranty information 77  
 Water Depth Sampler [vernier.com/wds](http://vernier.com/wds)  
 Water quality bottles [vernier.com/wq-bot](http://vernier.com/wq-bot)  
*Water Quality with Vernier* 27  
 Weather sensor 20, 25, 32  
 Weather stations [vernier.com/weather](http://vernier.com/weather)  
 Web VPython 59  
 Wide-range temperature probes  
   Go Direct Wide-Range Temperature 36  
   Wide-Range Temperature Probe  
     [vernier.com/wrt-bta](http://vernier.com/wrt-bta)  
 Wind Energy Exploration Packages 64  
*Wind Energy Explorations* 64

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# Welcome to the Vernier STEM Classroom

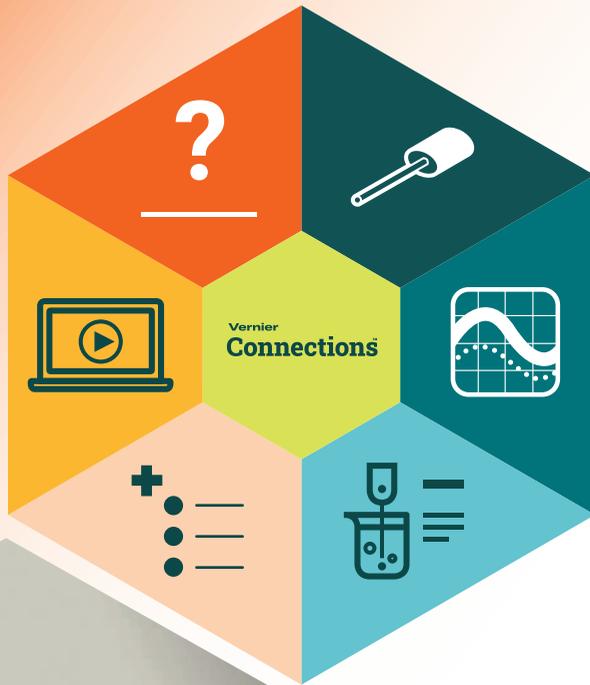
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Everything we do for high school science educators and their students can be found in the Vernier STEM Classroom.

The Vernier STEM Classroom is an integrated approach to using the full catalog of Vernier hardware, software, content, assessment, professional development, and technical support to make a high-quality STEM education possible for all high school students. Enhancing the Vernier STEM Classroom is **Vernier Connections™** (see page 4–5) a powerful web-based platform that combines our data-collection tools, lessons and experiments, and formative assessment to support educators in engaging all students with hands-on, culturally relevant science education.



# What is the Vernier STEM Classroom?



## Hardware

Designed for education and built to last, **Vernier hardware is durable, dependable, and affordable.** Our comprehensive catalog of science education hardware includes **sensors, probes, interfaces, and lab equipment**—all of which are designed to help students engage with key STEM concepts.

## Software

**Our award-winning, easy-to-use software brings data collection, visualization, and analysis to students' fingertips.** In the process, it helps boost engagement, increases understanding of complex STEM concepts, and brings science to life.

## Content

Vernier offers **hundreds of educator-tested, ready-to-use experiments and investigations** that support implementation of Vernier technology. With Vernier Connections, we are building new investigations and **enhancing existing Vernier experiments to support three-dimensional learning.**

## Assessment

Formative assessments in the Connections platform provides valuable information to **help educators monitor student learning and target lessons** to meet the needs of every student to help them succeed.

## Professional Development

When it comes to professional development for science educators, **we offer a variety of in-person and online options. From subject-specific webinars to personalized training with our science education experts,** we help educators address their unique challenges and equip them with skills and resources to ensure success.

## Technical Support

Our priority is to provide STEM educators with **unparalleled customer service, technical support, and resources so they are always supported when integrating our technology.** Our renowned technical support team includes former educators who draw from their classroom experience to answer educators' questions and find solutions.



Get the whole story at [vernier.science/stem-classroom](https://www.vernier.com/science/stem-classroom)



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