

# Vernier Science Education



College  
Catalog  
2023



# Welcome!

Dear educator,

At Vernier, educators are at the heart of everything we do. Many of us are former educators—and all of us are dedicated to supporting current educators. That support starts with understanding the unique challenges educators face today, such as helping students catch up on unfinished learning caused by the COVID-19 pandemic and seeing many colleagues recently retire from teaching.

We also care deeply about education, which is why we are dedicated to setting educators up for success and giving them the tools they need to engage students through hands-on, socially relevant science education. For example

- We provide educators with one hour of complimentary professional development on how to use our technology in the classroom or in a particular lesson.
- We host free subject-specific webinars to demonstrate engaging ways to use our technology.
- We offer more than 1,000 educator-tested, ready-to-use experiments that bring science to life for students.

Recovering from the pandemic is everyone's job. Ensuring we have a STEM-literate society to tackle the challenges of today and tomorrow is our goal—and partnering with educators and communities to build a STEM-literate society is our guiding principle. To emphasize this commitment, in 2022, we changed our name to Vernier Science Education.

Although our name is different, our dedication to hands-on science learning, our deep commitment to being an authentic and trusted partner to educators,

and our support for all aspects of STEM education remain the same. In addition, we remain dedicated to developing new and better ways to engage all students—regardless of whether they want to pursue a STEM career.

To that end, we are continuously developing data-collection devices based on educators' feedback and needs. We are also working on Vernier Connections™, a web-based platform to help educators engage students through phenomena-based learning and real-world applications, and strengthening our Vernier Graphical Analysis™ Pro software to help students make critical connections between abstract scientific ideas and the natural world.

We appreciate your ongoing support, and we are grateful for everything you do. If you have any questions or need ideas for how to use our products, please contact us. We are here to help!

Thank you for continuing to inspire us—and partnering with us to create the next generation of STEM-literate citizens.



John Wheeler  
CEO  
jwheeler@vernier.com



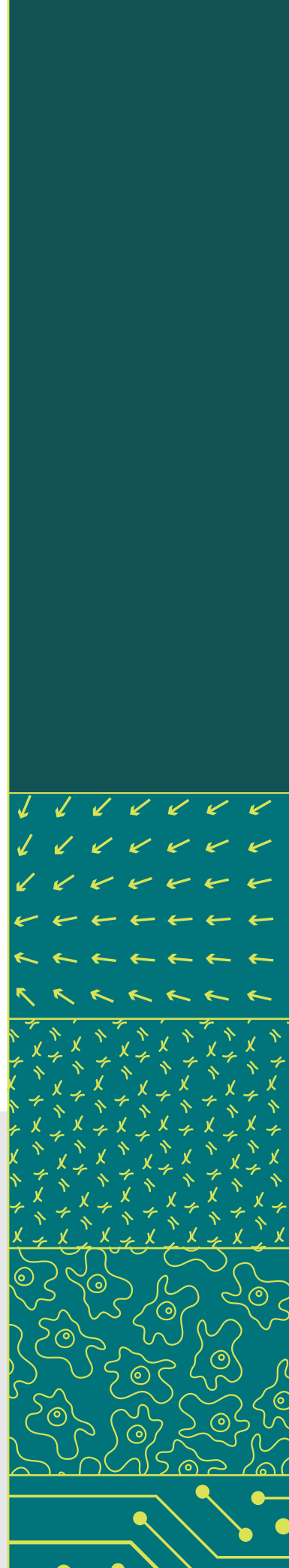
Dave and Christine Vernier  
Co-Presidents  
dvernier@vernier.com and cvernier@vernier.com

## Why Vernier? Endless Possibilities.

Our durable hardware and quality software are designed and priced for hands-on student use whether learning remotely or in the laboratory. We have ready-to-go experiments and resources in a wide variety of subjects.

BIOLOGY • CHEMISTRY • PHYSICS • ENGINEERING  
AGRICULTURAL SCIENCE • ENVIRONMENTAL SCIENCE • PHYSIOLOGY

Our sensors and data-collection technology are so versatile that you can use them in nearly any science or engineering course.



## Go Direct Spectrometers

Save time and space with our suite of Go Direct® spectrometers. These innovative, easy-to-use instruments have a small footprint and collect data in seconds. Our spectrometers also offer a robust set of capabilities, including

- Full spectrum analysis of samples in seconds
- Beer's law analysis (e.g., absorbance vs. concentration)
- Kinetics experiments (e.g., absorbance vs. time)
- Various modes of data collection (e.g., absorbance, %transmittance, fluorescence, and emissions)

Data can be collected and analyzed using Vernier Spectral Analysis® or LabQuest® App, which offer various analysis features, such as curve fitting and data interpolation. Plus, our free Vernier Spectral Analysis app works with a wide variety of devices via Bluetooth® wireless technology or USB.

**Learn more on pp. 14–17, 25.**



### Go Direct SpectroVis® Plus Spectrophotometer

GDX-SVISPL

**See page 7, 13.**



### Go Direct Visible Spectrophotometer

GDX-SPEC-VIS

**See page 17.**



### Go Direct UV-VIS Spectrophotometer

GDX-SPEC-UV

**See page 7, 16.**



### Go Direct Fluorescence/UV-VIS Spectrophotometer

GDX-SPEC-FUV

**See page 7, 14.**



### Go Direct Emissions Spectrometer

GDX-SPEC-EM

**See page 25.**

“Students don’t learn effectively by just sitting and listening—they need to be consistently engaged in what they are learning about. As educators, we are always looking for ways to optimize the learning experience for our students, especially in today’s increasingly remote environment.

*David Craig  
Oregon State University*

Join these institutions, and hundreds of others,  
already using Vernier technology:

Arizona State University	McGill University	University of Cambridge
Baltimore City Community College	Miami University	University of Chicago
Benedictine University	Michigan Technological University	University of Hong Kong
California State University—Fullerton	Mississippi State University	University of Kansas
Cameron University	National University of Colombia	University of Minnesota—Minneapolis
Canisius College	National University of Singapore	University of Nebraska—Lincoln
Charles University	Oregon State University	University of Pennsylvania
Colorado School of Mines	Princeton University	University of Puerto Rico
Cornell University	Queensborough Community College	University of Sydney
Cuyahoga Community College	Quinnipiac University	University of Tennessee—Chattanooga
Delft University of Technology	Saint Mary’s University	University of Toronto
Dickinson College	Stanford University	University of Washington
ETH Zurich	Stephen F. Austin State University	University of Wisconsin—Madison
Georgia Tech	Sungkyunkwan University	Vincennes University
Harvard University	TEC Monterrey	Virginia Commonwealth University
Haskell Indian Nations University	Texas A&M	Wake Technical Community College
Immaculata University	The Ohio State University	West Virginia Wesleyan College
Lehigh University	University of Arizona	Yale University
Lund University	University of British Columbia	
Massachusetts Institute of Technology	University of California—Berkeley	



# Biology

## Why Vernier?

Vernier biology solutions help students form a deep understanding of key scientific concepts. Whether you are introducing your students to enzymes or exploring primary productivity, our probeware and ready-to-go experiments are the right fit for your laboratory.

### Quality

Durable hardware for lab and field use

### Affordable

Designed for education and education budgets

### Versatile

Supports a variety of devices and experiments



Your great products and superb support of them have been a major part of my labs and are very much appreciated.

*David Willey*  
*University of Pittsburgh*

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

# A Guide to Vernier Data Collection

We're here to support you as an educator as you incorporate data-collection technology into your instruction. See how our products provide you with affordable laboratory solutions designed for student success.

Our Guarantee: Most of our products are protected by a 5-year limited warranty. And after five years? We'll make every attempt to repair your equipment.

GDX

## What You Need to Get Started with Go Direct Sensors

### Go Direct Sensor

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

### Device

Go Direct® sensors connect to a wide variety of commonly used devices, including Chromebooks, computers, tablets, smartphones, and LabQuest® 3.

### Software

Vernier Graphical Analysis™ Pro  
Vernier Spectral Analysis®

### Lab Book

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 across your department.

LQ

## What You Need to Get Started with LabQuest 3

### Sensor

#### Go Direct Sensor

These versatile sensors connect to LabQuest 3 via Bluetooth wireless technology or USB.

*Go Direct spectrometers connect only via USB.*

#### LabQuest Sensor

LabQuest sensors connect directly to LabQuest 3 sensor ports (BTA/BTD).

### LabQuest 3

LabQuest 3 serves as a standalone data-collection platform that works with all Vernier sensors.

### Software

LabQuest App

### Lab Book

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 across your department.

## Software

### Vernier Spectral Analysis

GDX

Spectral Analysis supports our family of spectrometers on computers, Chromebooks, and compatible mobile devices. Use it to generate full spectra, create standard curves, and conduct kinetics experiments.

### LabQuest App

GDX

LQ

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

### Vernier Graphical Analysis Pro

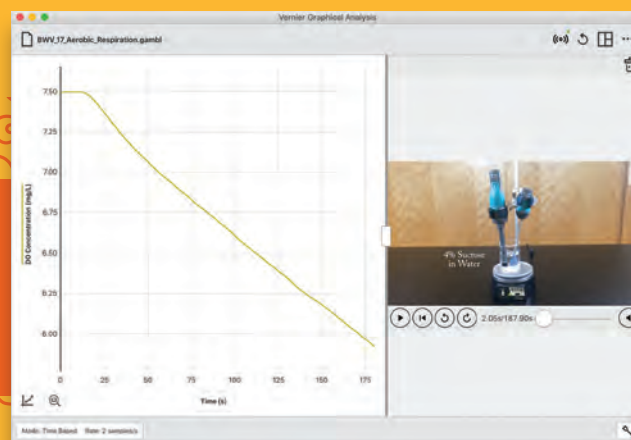
GDX

LQ

Our award-winning app enables advanced data analysis, provides opportunities to reinforce and extend learning, and includes features that support hybrid teaching models.

#### Free Trial for Educators

Try out Graphical Analysis Pro for free for 30 days. Access the sample experiments and enhanced analysis tools to use with your students.  
**Get a free trial and learn about site license options at [vernier.com/graphical-analysis](https://www.vernier.com/graphical-analysis)**



## Partnerships

### LabArchives

We have partnered with LabArchives™ to bring high-quality biology content to instructors through the Lab Builder library. Because all content is structured and standardized, instructors can arrange, customize, and add content to their courses with ease. [Learn more at vernier.com/lab-archives](https://www.vernier.com/lab-archives)

### ADInstruments

We have partnered with ADInstruments to provide state-of-the-art, customizable biology content using ADInstruments' platform, Lt. This platform supports real-time data collection and analysis with many Vernier sensors and includes instructional videos, quizzes, and classroom management tools. [Learn more at vernier.com/adinstruments](https://www.vernier.com/adinstruments)

## Free 30-Day Preview

Not sure if our technology is right for your laboratory? Our risk-free preview program makes it easier to decide. Most Vernier products are available for a 30-day preview (or longer, if requested) to educational institutions.

# General Biology

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

This sensor measures gaseous carbon dioxide concentration levels, air temperature, and relative humidity. With built-in temperature compensation and humidity protection, this sensor is ideal for measuring fermentation, respiration, and photosynthesis rates.

GDX-CO2 \$225

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

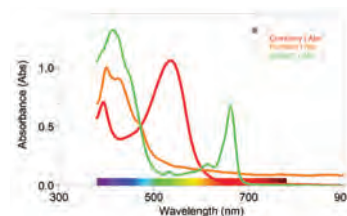


## Go Direct SpectroVis® Plus

Use this spectrophotometer to collect a full-wavelength spectrum (absorbance, percent transmittance, fluorescence, or intensity), study absorbance vs. concentration (create standard curves), or monitor enzyme activity (enzyme kinetics).

GDX-SVISPL \$449

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



**Vernier Spectral Analysis**

FREE DOWNLOAD

Learn more on page 7.

## Go Direct Tris-Compatible Flat pH

Use this sensor to measure the pH of solutions. It features a sealed, gel-filled, double-junction electrode, making it compatible with Tris buffers and solutions containing proteins or sulfides.

GDX-FPH \$134

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



## Go Direct Optical Dissolved Oxygen

Use this sensor to measure dissolved oxygen, water temperature, and atmospheric pressure. It's ideal for experiments in biology, ecology, and environmental science.

GDX-ODO \$359

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



## Biology with Vernier

This book includes 31 experiments for fundamental concepts in biology. The instructor information section included for each experiment contains reagent preparation information, sample data, and tips for successful completion.

Topics

- Cell respiration
- Membrane diffusion
- Osmosis
- Photosynthesis and transpiration
- Human physiology

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



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

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

## Investigating Biology through Inquiry

This book includes 22 investigations for many fundamental concepts in biology. Each investigation includes a preliminary activity, instructor information, sample researchable questions, and sample data.

Topics

- Cell and molecular biology
- Organismal biology
- Ecology
- Evolution

[vernier.com/bio-i](http://vernier.com/bio-i)



**Download only**  
BIO-I-E \$44

**Printed book + download**  
BIO-I \$52

## Biology Go Direct Starter Package

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

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



# Human Physiology

## Go Direct EKG

Use Go Direct® EKG to record electrical activity of the heart or skeletal muscles.

GDX-EKG \$169 [vernier.com/gdx-ekg](http://vernier.com/gdx-ekg)



## Go Direct Hand Dynamometer

Measure grip and pinch strength, and perform muscle fatigue studies.

GDX-HD \$119 [vernier.com/gdx-hd](http://vernier.com/gdx-hd)



## Go Direct Respiration Belt

Use this sensor to measure human respiration rate and study breathing patterns.

GDX-RB \$109  
[vernier.com/gdx-rb](http://vernier.com/gdx-rb)



## Go Direct Spirometer

This multi-channel sensor can be used to measure tidal volume, vital capacity, flow rate, air pressure, and respiration rate.

GDX-SPR \$219  
[vernier.com/gdx-spr](http://vernier.com/gdx-spr)



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

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

GDX-O2 \$205  
[vernier.com/gdx-o2](http://vernier.com/gdx-o2)



## Go Direct Blood Pressure

This affordable, non-invasive sensor is designed to easily measure human blood pressure.

GDX-BP \$125 [vernier.com/gdx-bp](http://vernier.com/gdx-bp)



## Human Physiology Experiments: Volume 1

This book contains 14 experiments that encourage students to investigate the physiology of the cardiac, muscular, respiratory, vascular, and nervous systems using Go Direct sensors.

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

*This lab book provides instructions for data collection with Vernier Graphical Analysis™ and Go Direct sensors only.*



**Download only**  
HSB-HP-E \$33

**Printed book + download**  
HSB-HP \$41

## Human Physiology Experiments: Volume 2

An expansion of our *Human Physiology Experiments: Volume 1* lab book, the setup for these experiments is minimal—students are collecting data within minutes.

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

*This lab book provides instructions for data collection with Vernier Graphical Analysis and Go Direct sensors only.*



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

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

## Human Physiology Go Direct Standard Package

This package includes 11 sensors that work with Vernier Graphical Analysis Pro and LabQuest® 3.

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

GDP-HP-DX ⚡ \$1,300

Buy 8 or more packages at \$1,261 and save \$312.

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

**Starter package also available**





## Spectrometers

### Go Direct SpectroVis® Plus

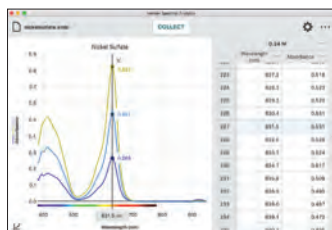
Use this spectrophotometer to collect a full-wavelength spectrum (absorbance, percent transmittance, fluorescence, or intensity\*), study absorbance vs. concentration (create standard curves), or monitor enzymatic activity (enzyme kinetics).

GDX-SVISPL \$449

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



\* Fiber optic cable purchased separately.



### Go Direct UV-VIS Spectrophotometer

The Go Direct UV-VIS Spectrophotometer connects to your device via Bluetooth® wireless technology or USB to generate full spectra, Beer's law data, and kinetic traces of ultraviolet and visible-absorbing samples such as aspirin, DNA, proteins, and NADH.

GDX-SPEC-UV \$2,499

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



### Go Direct Fluorescence/UV-VIS Spectrophotometer

This spectrophotometer measures the fluorescence and absorbance spectra of samples such as quinine sulfate, fluorescein, chlorophyll, and fluorescent proteins, all while connecting to your device via Bluetooth wireless technology or USB.

GDX-SPEC-FUV \$2,999

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



## Vernier Spectral Analysis

Our free Vernier Spectral Analysis® app makes it easy to incorporate spectroscopy into your general biology and biotechnology experiments. Using the app, students can collect a full spectrum and explore topics such as plant pigments, enzyme kinetics, and Beer's law (standard curves).

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

## Go Direct Tris-Compatible Flat pH

This pH sensor features a sealed, gel-filled, double-junction electrode, making it compatible with Tris buffers and solutions containing proteins or sulfides.

GDX-FPH \$134

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



## BlueView™ Transilluminator

This transilluminator uses super bright blue LEDs to illuminate electrophoresis gels stained with fluorescent dyes (e.g., SYBR® Safe). This combination is a safer alternative to ethidium bromide and a UV transilluminator.

BLUE-VIEW ⚡ \$425

[vernier.com/blue-view](http://vernier.com/blue-view)



## Stir Station

This combination stir plate/ring stand can be used with AC power (included) or four C batteries (not included).

STIR \$139

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



## OHAUS Scout Balances

Collect mass data from OHAUS Scout® balances using LabQuest 3. (OHAUS Scout USB Cable is required and not included.) ⚡

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



## Vernier and Bio-Rad

**BIO-RAD**

Bio-Rad® combines high-quality supplies, equipment, and curricula with outstanding customer service and technical support—things we believe are important to teachers. Vernier and Bio-Rad enhance classroom experiences with joint experiments and curricula for biotechnology.

Download free sample experiments at [vernier.com/bio-rad-kits](http://vernier.com/bio-rad-kits)

# Environmental Science

## Go Direct Optical Dissolved Oxygen

Use this sensor to measure dissolved oxygen, water temperature, and atmospheric pressure. It is ideal for experiments in environmental science.

GDX-ODO \$359

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



## Go Direct Conductivity

Use this sensor to measure total dissolved solids (TDS) in aquatic samples or the salinity of soil samples.

GDX-CON \$119

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



## Go Direct Temperature

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

Range: -40 to 125°C

GDX-TMP \$78

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



## Go Direct Tris-Compatible Flat pH

The flat glass shape of this pH sensor is more durable and easier to clean than the traditional pH bulb shape, making it the best choice for environmental science.

GDX-FPH \$134

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



## Go Direct Nitrate Ion-Selective Electrode

Use this sensor to measure nitrate concentration in water samples from water sources throughout your watershed.

GDX-NO3 \$279

[vernier.com/gdx-no3](http://vernier.com/gdx-no3)



## Go Direct Energy

Simpler to use than a multimeter, Go Direct® Energy measures the voltage and current output of a renewable energy system. Connect a source, such as a small wind turbine or solar panel, and our Vernier Graphical Analysis™ Pro app displays voltage, current, power, and energy output.

GDX-NRG \$98

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



## LabQuest 3

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

The all-new LabQuest® 3 is a standalone data-collection platform that students can use to collect, analyze, and interact with data efficiently. With its new touch-screen abilities, students can navigate the platform with ease, and because of its wireless capabilities, students can collect data anywhere.

LABQ3 \$399

[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.

## 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 that measures ambient temperature, humidity, wind speed, wind chill, dew point, barometric pressure, and more. The included Go Direct Weather Vane accessory is required to report wind direction.

Mounting Go Direct Weather System on a tripod is recommended (tripod not included).

GDX-WTVA \$138

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



## Davis Vantage Vue Weather Station

The wireless Davis® Vantage Vue® weather station provides accurate, reliable weather monitoring in a self-contained, easy-to-install system.

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



## Go Direct Sensor Clamp

Prevent accidental drops during field investigations with the Go Direct Sensor Clamp.

GDX-CLAMP \$14

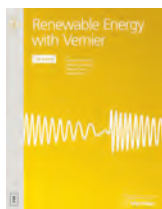
[vernier.com/gdx-clamp](http://vernier.com/gdx-clamp)



## 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)



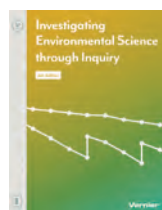
**Download only**  
REV-E \$44

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

## Investigating Environmental Science through Inquiry

This book contains 34 inquiry-based environmental science investigations.\* Topics include Earth systems and resources, the living world, global change and population, energy resources and consumption, and pollution.

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



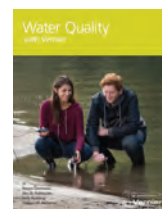
**Download only**  
ESI-E \$44

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

## Water Quality with Vernier

With the 18 tests in *Water Quality with Vernier*,\* students investigate the water quality of a body of water by testing pH, total dissolved solids, dissolved oxygen, BOD, and more.

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



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

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

# Biology Products

## Go Direct Sensors

Product	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	\$119
Go Direct EKG	GDX-EKG	\$169
Go Direct Ethanol Vapor	GDX-ETOH	\$165
Go Direct Energy	GDX-NRG	\$98
Go Direct Force and Acceleration	GDX-FOR	\$119
Go Direct Gas Pressure	GDX-GP	\$99
Go Direct Hand Dynamometer	GDX-HD	\$119
Heart Rate Monitors		
Go Wireless Exercise Heart Rate	GW-EHR	\$79
Go Wireless® Heart Rate	GW-HR	\$98
Ion-Selective Electrodes		
Go Direct Ammonium Ion-Selective Electrode	GDX-NH4	\$279
Go Direct Nitrate Ion-Selective Electrode	GDX-NO3	\$279
Go Direct Light and Color	GDX-LC	\$89
Go Direct O <sub>2</sub> Gas	GDX-O2	\$205
Go Direct Optical Dissolved Oxygen	GDX-ODO	\$359
pH Sensors		
Go Direct pH	GDX-PH	\$109
Go Direct Tris-Compatible Flat pH	GDX-FPH	\$134
Go Direct Respiration Belt	GDX-RB	\$109
Spectrophotometers		
Go Direct SpectroVis® Plus	GDX-SVISPL	\$449
Go Direct Fluorescence/UV-VIS Spectrophotometer	GDX-SPEC-FUV	\$2,999
Go Direct UV-VIS Spectrophotometer	GDX-SPEC-UV	\$2,499
Go Direct Spirometer	GDX-SPR	\$219
Temperature Probes		
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78
Go Direct Wide-Range Temperature	GDX-WRT	\$128
Go Direct Weather	GDX-WTHR	\$109
Go Direct Weather System	GDX-WTVA	\$138

## LabQuest Sensors

Product	Order Code	Price
PAR Sensor	PAR-BTA	\$249
Relative Humidity Sensor	RH-BTA	\$79
Salinity Sensor	SAL-BTA	\$139
Soil Moisture Sensor	SMS-BTA	\$129
Turbidity Sensor	TRB-BTA	\$124

## Accessories and Lab Equipment

Product	Order Code	Price
BioChamber 250 ⚠	BC-250	\$9
BioChamber 2000 ⚠	BC-2000	\$22
BlueView Transilluminator ⚠	BLUE-VIEW	\$425
Disposable Bacteria Filters (pkg. of 10)	SPR-FIL10	\$45
Disposable Mouthpieces (pkg. of 30)	SPR-MP30	\$17
EKG Electrodes (pkg. of 100)	ELEC	\$19
Go Direct Charge Station	GDX-CRG	\$89
Go Direct Sensor Clamp	GDX-CLAMP	\$14
Nose Clip (pkg. of 10)	SPR-NOSE10	\$10
OHAUS® Balances ⚠	vernier.com/ohaus	
Primary Productivity Kit	PPK	\$44
Reflex Hammer Accessory Kit	RFX-ACC	\$29
Stir Station	STIR	\$139
Water Depth Sampler	WDS	\$94
Water Quality Bottles	WQ-BOT	\$28

## Lab Books\*

Product	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>Investigating Environmental Science through Inquiry</i> (LabQuest sensors only)	ESI	\$52
<i>Renewable Energy with Vernier</i>	REV	\$52
<i>Water Quality with Vernier</i> (LabQuest sensors only)	WQV	\$52

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

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



# Chemistry

## Why Vernier?

When you teach with Vernier, you're teaching with a complete chemistry solution. From titrations to spectroscopy, our sensors and instrumentation are backed by powerful analytical software, college-level experiments, and unparalleled support.

### Quality

Durable hardware for lab and field use

### Affordable

Designed for education and education budgets

### Versatile

Supports a variety of devices and experiments



“

The use of these technologies helps to build students' proficiency using instrumentation while providing them with hands-on experience that will better prepare them for careers in the chemistry field.

*Seth Barrett, PhD  
Muskingham University*

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

# A Guide to Vernier Data Collection

We're here to support you as an educator as you incorporate data-collection technology into your instruction. See how our products provide you with affordable laboratory solutions designed for student success.

Our Guarantee: Most of our products are protected by a 5-year limited warranty. And after five years? We'll make every attempt to repair your equipment.

GDX

## What You Need to Get Started with Go Direct Sensors

### Go Direct Sensor

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

### Device

Go Direct® sensors connect to a wide variety of commonly used devices, including Chromebooks, computers, tablets, smartphones, and LabQuest® 3.

### Software

Vernier Graphical Analysis™ Pro  
Vernier Spectral Analysis®  
Vernier Instrumental Analysis®

### Lab Book

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 across your department.

LQ

## What You Need to Get Started with LabQuest 3

### Sensor

#### Go Direct Sensor

These versatile sensors connect to LabQuest 3 via Bluetooth wireless technology or USB.  
*Go Direct spectrometers connect only via USB.*

#### LabQuest Sensor

LabQuest sensors connect directly to LabQuest 3 sensor ports (BTA/BTD).

### LabQuest 3

LabQuest 3 serves as a standalone data-collection platform that works with all Vernier sensors.

### Software

LabQuest App

### Lab Book

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 across your department.

## Software

### Vernier Spectral Analysis

GDX

Vernier Spectral Analysis supports our family of spectrometers. Use it to generate full spectra, conduct Beer's law investigations, and investigate kinetics.

### Vernier Instrumental Analysis

GDX

Vernier Instrumental Analysis is used for more advanced instrumentation such as Go Direct Mini GC,™ Go Direct Polarimeter, and Go Direct Cyclic Voltammetry System.

### LabQuest App

GDX

LQ

LabQuest 3 has built-in software that gives your students real-time graphing capabilities in a handheld device.

### Vernier Graphical Analysis Pro

GDX

LQ

Our award-winning app enables advanced data analysis, provides opportunities to reinforce and extend learning, and includes features that support hybrid teaching models.

### Free Trial for Educators

Try out Graphical Analysis Pro for free for 30 days. Access the sample experiments and enhanced analysis tools to use with your students. Get a free trial and learn about site license options at [vernier.com/graphical-analysis](http://vernier.com/graphical-analysis)



## Partnerships

### LabArchives

We have partnered with LabArchives™ to bring high-quality chemistry content to instructors through the Lab Builder library. Because all content is structured and standardized, instructors can arrange, customize, and add content to their courses with ease. [Learn more at vernier.com/lab-archives](http://vernier.com/lab-archives)

### ADInstruments

We have partnered with ADInstruments to provide state-of-the-art, customizable chemistry content using ADInstruments' platform, Lt. This platform supports real-time data collection and analysis with many Vernier sensors and includes pre- and post-lab questions and classroom management tools. [Learn more at vernier.com/adinstruments](http://vernier.com/adinstruments)

## General Chemistry

### Go Direct Temperature

Use this rugged temperature probe for investigating endothermic and exothermic reactions, determining the physical properties of water, and investigating intermolecular forces.

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

GDX-TMP \$78

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



### Go Direct pH

Go Direct pH is an important and versatile sensor for your laboratory. Conduct acid-base titrations, monitor pH changes during chemical reactions, and investigate buffers. 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 Gas Pressure

Explore gas laws and the Clausius-Clapeyron equation with this sensor that measures the absolute pressure of a gas.

Range: 0 to 400 kPa

GDX-GP \$99

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



### Go Direct SpectroVis® Plus

With a range of 380 to 950 nm, students can use this spectrophotometer to easily collect a full-wavelength spectrum, study absorbance vs. concentration, or monitor rates of reaction.

Collect and analyze data using Vernier Spectral Analysis, or LabQuest App.

GDX-SVISPL \$449

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



### 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)



### Stir Station

This combination stir plate/ring stand can be used with AC power (included) or four C batteries (not included).

STIR \$139

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



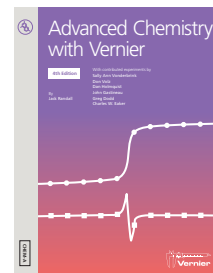
### Advanced Chemistry with Vernier

This book contains 35 ready-to-use student experiments that support general chemistry. Instructor notes with sample data are also included.

Topics

- Gas laws
- Titrations
- Spectroscopy
- Electrochemistry

[vernier.com/chem-a](http://vernier.com/chem-a)



**Download only**  
CHEM-A-E \$44

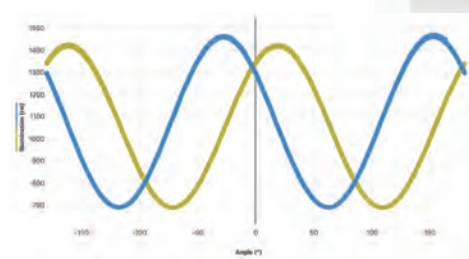
**Printed book + download**  
CHEM-A \$52

## Go Direct Polarimeter

The concept of chirality can be difficult for students to visualize. Go Direct® Polarimeter provides a visual representation of this concept by measuring the optical rotation of optical isomers such as sugars, amino acids, and proteins.

GDx-POL \$545

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



Comparing the optical rotations of fructose and sucrose

### Free Software

Vernier Instrumental Analysis

See page 15.

## Go Direct Fluorescence/UV-VIS Spectrophotometer

This spectrophotometer measures the fluorescence and absorbance spectra of samples such as quinine sulfate, fluorescein, chlorophyll, and fluorescent proteins, all while connecting to your device via Bluetooth® wireless technology or USB.

GDx-SPEC-FUV \$2,999

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

### Wavelength Range

- 220 to 850 nm

### Light Sources

- Visible: LED-boosted tungsten
- UV: Deuterium
- Fluorescence: Exchangeable LEDs for excitation at 375 nm, 450 nm, and 525 nm (additional wavelengths sold separately)

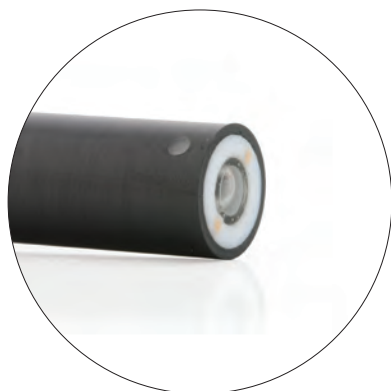


## Go Direct Tris-Compatible Flat pH

Go Direct Tris-Compatible Flat pH is a double-junction electrode for measuring pH in Tris buffers and solutions containing proteins or sulfides. The flat glass shape makes it easy to clean and useful for measuring the pH of semisolids such as soil slurries and certain foods.

GDx-FPH \$134

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

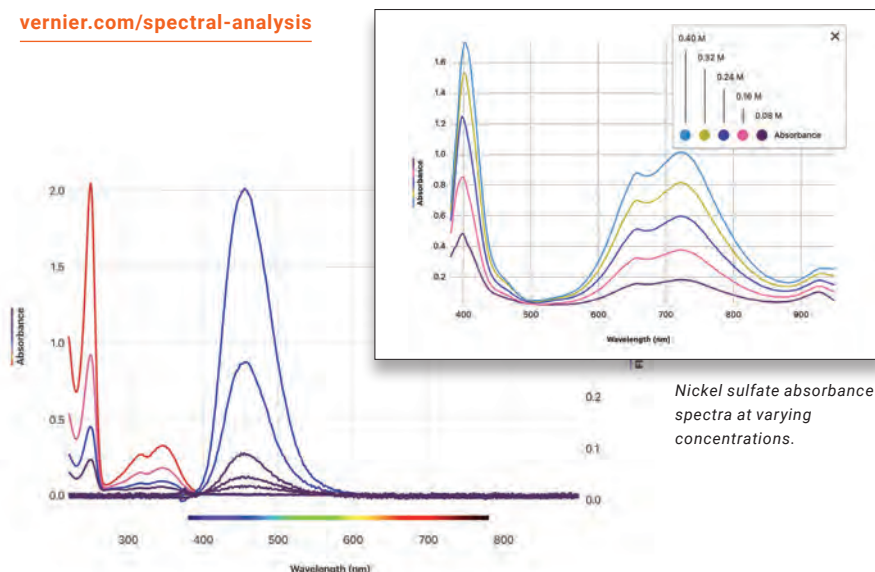


## Vernier Spectral Analysis

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.

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

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



Quinine Sulfate spectra at varying concentrations; absorbance (left) and Fluorescence with excitation at 375 nm (right)

Nickel sulfate absorbance spectra at varying concentrations.



## Go Direct Melt Station

Go Direct Melt Station 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 ⬆ \$594

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



## Go Direct UV-VIS Spectrophotometer

The Go Direct UV-VIS Spectrophotometer connects to your device via Bluetooth wireless technology or USB to generate full spectra, Beer's law data, and kinetic traces of ultraviolet and visible-absorbing samples such as aspirin, DNA, proteins, and NADH.

GDX-SPEC-UV \$2,499

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

### Wavelength Range

- 220 to 850 nm

### Light Sources

- Visible: LED-boosted tungsten
- UV: Deuterium



## Go Direct Wide-Range Temperature

Go Direct Wide-Range Temperature is designed to be used as you would use a thermometer for experiments such as the recrystallization of benzoic acid, simple and fractional distillations, determination of boiling points, the synthesis and analysis of aspirin and other organic compounds, and more.

Range: -20 to 330°C

GDX-WRT \$128

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



### Free Software

### Vernier Spectral Analysis

See page 14.

## Go Direct Mini GC

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. This portable gas chromatograph detects polar and nonpolar compounds allowing for a wide range of experiments. Sample experiments include fractional distillation and Fischer esterification.

GDX-GC \$3,599

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



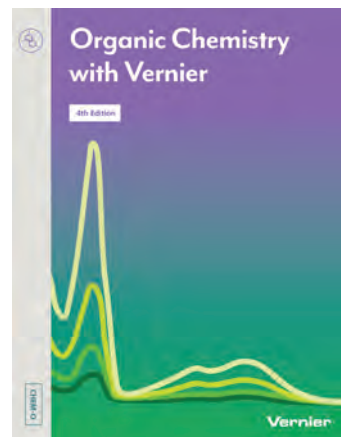
## Organic Chemistry with Vernier

*Organic Chemistry with Vernier* contains 26 experiments that represent a broad range of topics and techniques taught in most college organic chemistry lab courses. The experiments in this book build upon prior knowledge, laboratory techniques, and skills that students learn in general chemistry courses.

### Topics

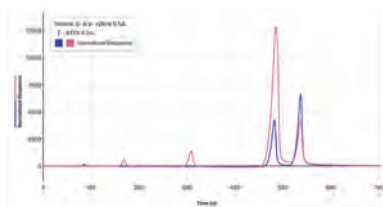
- Distillation
- Chromatography
- Synthesis
- Polarimetry

[vernier.com/chem-o](http://vernier.com/chem-o)



## Vernier Instrumental Analysis

With our free Vernier Instrumental Analysis® app, students can collect and analyze data from our Go Direct Mini GC, Go Direct Polarimeter, and Go Direct Cyclic Voltammetry System (page 16) using computers, Chromebooks, or compatible mobile devices.



Comparing chromatograms of a BTEX mixture with hexane and xylene isomers

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

### Download only

CHEM-O-E \$44

### Printed book + download

CHEM-O \$52

# Analytical and Physical Chemistry

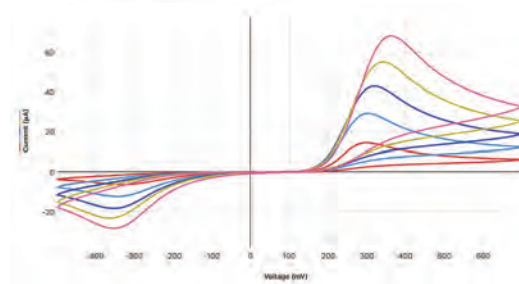
## Go Direct Cyclic Voltammetry System

Give your students hands-on experience with electrochemically active reactions using this affordable potentiostat and disposable screen-printed electrodes.

Easily incorporate electrochemistry into your curriculum using our e-book, *Electrochemistry Experiments with the Go Direct Cyclic Voltammetry System*, available for free with your purchase.

GDX-CVS \$999

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



Cyclic voltammograms of acetaminophen standard solutions

## Go Direct Polarimeter

The concept of chirality can be difficult for students to visualize. Go Direct® Polarimeter provides a visual representation of this concept by measuring the optical rotation of optical isomers such as sugars, amino acids, and proteins.

GDX-POL \$545

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



## Free Software

Vernier Instrumental Analysis®

See page 15.

## Go Direct UV-VIS Spectrophotometer

An easy-to-use and accurate instrument ideal for measuring the absorbance spectra of various chemical and biochemical compounds, the Go Direct UV-VIS Spectrophotometer connects to your device via Bluetooth® wireless technology or USB.

GDX-SPEC-UV \$2,499

### Wavelength Range

- 220 to 850 nm

### Light Sources

- Visible: LED-booster tungsten
- UV: Deuterium

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



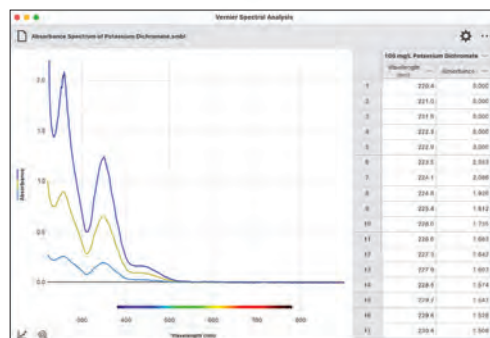
## Recommended Accessory

### Vernier Spectrophotometer Optical Fiber

Analyze emissions spectra of gas discharge tubes or flame tests with this optical fiber.

VSP-FIBER \$79

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



Examining the absorbance spectra of three concentrations of potassium dichromate solutions using the Go Direct UV-VIS Spectrophotometer and Spectral Analysis

## Free Software

Vernier Spectral Analysis®

See page 14.

## Go Direct pH

Use this general-purpose pH sensor to monitor the pH of aqueous solutions.

GDX-PH \$109

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



## Go Direct Wide-Range Pressure

Using robust metal fittings and a leakproof seal, Go Direct Wide-Range Pressure measures absolute pressures up to 690 kPa (100 psi) with excellent accuracy.

GDX-WRP \$219

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



## Go Direct Fluorescence/UV-VIS Spectrophotometer

The Go Direct Fluorescence/UV-VIS Spectrophotometer measures the fluorescence and absorbance spectra of various samples. It easily connects to your device via Bluetooth wireless technology or USB to conduct Beer's law experiments, measure a Stokes shift, or measure quantum yields.

GDX-SPEC-FUV \$2,999

### Wavelength Range

- 220 to 850 nm

### Light Sources

- Visible: LED-boosted tungsten
- UV: Deuterium
- Fluorescence: Exchangeable LEDs for excitation at 375 nm, 450 nm, and 525 nm (additional wavelengths sold separately)

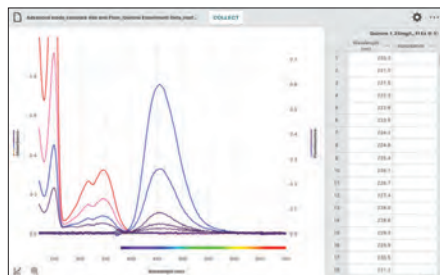
Free experiment downloads available at [vernier.com/gdx-spec-fuv](http://vernier.com/gdx-spec-fuv)



## Free Software

### Vernier Spectral Analysis

See page 14.



Absorbance and fluorescence spectra of quinine sulfate at varying concentrations

## Vernier Flash Photolysis Spectrometer

The Vernier Flash Photolysis Spectrometer is perfect for students to explore the fundamental principles of photochemical reactions. This spectrometer now includes 13 detection filters for measuring the absorption and emission changes of a photoexcited sample with microsecond resolution. Excitation filters (2) are also included.

VSP-FP \$5,899

### Wavelength Range

- 450 to 750 nm

### Light Sources

- Xenon flashlamp (pump) white LED (probe)
- 13 exchangeable filters for detection wavelength
- 2 exchangeable colored glass filters for excitation wavelength

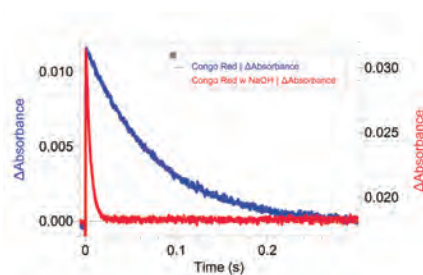
Free experiment downloads available at [vernier.com/vsp-fp](http://vernier.com/vsp-fp)



## Free Software

Collect data with the free all-inclusive Flash Photolysis Spectrometer Software.\*

\*Available for Windows® only



Fast photocatalysis of Congo Red

## Go Direct Visible Spectrophotometer

The Go Direct Visible Spectrophotometer is a robust and accurate portable visible light spectrophotometer that connects easily to your device via Bluetooth wireless technology or USB to conduct Beer's law experiments, kinetic or equilibrium studies of absorbance, or emission spectrum analysis.

GDX-SPEC-VIS \$1,899

### Wavelength Range

- 380 to 950 nm

### Light Sources

- Visible: LED-boosted tungsten

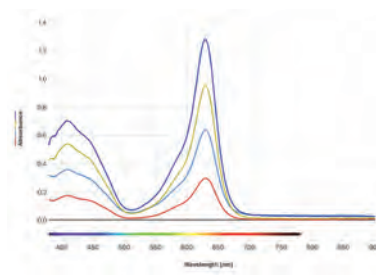
[vernier.com/gdx-spec-vis](http://vernier.com/gdx-spec-vis)



## Free Software

### Vernier Spectral Analysis

See page 14.



Absorbance spectra for green food coloring at various concentrations

# Chemistry Products

## Go Direct Sensors

Sensor	Order Code	Price
Go Direct® Colorimeter	GDX-COL	\$129
Conductivity Probes		
Go Direct Conductivity	GDX-CON	\$119
Go Direct Platinum-Cell Conductivity	GDX-CONPT	\$180
Current Probes		
Go Direct Constant Current System	GDX-CCS	\$80
Go Direct Current	GDX-CUR	\$89
Go Direct Drop Counter	GDX-DC	\$109
Go Direct Electrode Amplifier	GDX-EA	\$79
Gas Pressure Sensors		
Go Direct Gas Pressure	GDX-GP	\$99
Go Direct Wide-Range Pressure	GDX-WRP	\$219
Go Direct Melt Station ⚠	GDX-MLT	\$594
Go Direct ORP	GDX-ORP	\$119
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 Radiation Monitor	GDX-RAD	\$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	\$128
Go Direct Voltage	GDX-VOLT	\$79

## LabQuest Sensors

Sensor	Order Code	Price
Colorimeter	COL-BTA	\$128
Conductivity Probes		
Conductivity Probe	CON-BTA	\$115
Platinum-Cell Conductivity Probe	CONPT-BTA	\$170
Current Probes		
Constant Current System	CCS-BTA	\$70
Current Probe	DCP-BTA	\$49
Drop Counter	VDC-BTD	\$109
Electrode Amplifier	EA-BTA	\$55
Gas Pressure Sensors		
Gas Pressure Sensor	GPS-BTA	\$94
Pressure Sensor 400	PS400-BTA	\$219
Instrumentation Amplifier	INA-BTA	\$89
Melt Station ⚠	MLT-BTA	\$599
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	\$559
Radiation Monitor	VRM-BTD	\$199
Temperature Probes		
Stainless Steel Temperature Probe	TMP-BTA	\$40
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

## Instrumentation

Instrument	Order Code	Price
Go Direct Cyclic Voltammetry System	GDX-CVS	\$999
Go Direct Mini GC™	GDX-GC	\$3,599
Go Direct Polarimeter	GDX-POL	\$545

## Spectrometers

Spectrometer	Order Code	Price
Go Direct Emissions Spectrometer	GDX-SPEC-EM	\$950
Vernier Flash Photolysis Spectrometer	VSP-FP	\$5,899
Go Direct Fluorescence/UV-VIS Spectrophotometer	GDX-SPEC-FUV	\$2,999
Go Direct SpectroVis® Plus	GDX-SVISPL	\$449
Go Direct Visible Spectrophotometer	GDX-SPEC-VIS	\$1,899
Go Direct UV-VIS Spectrophotometer	GDX-SPEC-UV	\$2,499

## Lab Equipment

Equipment	Order Code	Price
Electrode Support	ESUP	\$10
OHAUS® Balances ⚠	vernier.com/ohaus	
Stir Station	STIR	\$139
Cuvette Rack	CUV-RACK	\$9
Go Direct Charge Station	GDX-CRG	\$89

## Lab Books\*

Equipment	Order Code	Price
<i>Advanced Chemistry with Vernier</i>	CHEM-A	\$52
<i>Chemistry with Vernier</i>	CWV	\$52
<i>Food Chemistry Experiments</i>	HSB-FOOD	\$41
<i>Investigating Chemistry through Inquiry</i>	CHEM-I	\$52
<i>Organic Chemistry with Vernier</i>	CHEM-O	\$52

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

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



# Physics

## Why Vernier?

Vernier started when one educator, Dave Vernier, decided to build solutions to bring physics to life for his students. Today, our complete physics solution is still powered by the desire to inspire students and foster learning and is backed by powerful software and unparalleled support.

### Quality

Durable hardware lasts for years of use

### Affordable

Designed for education and education budgets

### Versatile

Supports a variety of devices and experiments



“

I find your extensive suite of hardware—and your innovative software—extremely helpful in my teaching. Couldn't do it without your stuff!

*Barbara Hughey  
Massachusetts Institute of Technology  
Cambridge, MA*

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

# A Guide to Vernier Data Collection

We're here to support you as an educator as you incorporate data-collection technology into your instruction. See how our products provide you with affordable laboratory solutions designed for student success.

Our Guarantee: Most of our products are protected by a 5-year limited warranty. And after five years? We'll make every attempt to repair your equipment.

GDX

## What You Need to Get Started with Go Direct Sensors

### Go Direct Sensor

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

### Device

Go Direct® sensors connect to a wide variety of commonly used devices, including Chromebooks, computers, smartphones, tablets, and LabQuest® 3.

### Software

Vernier Graphical Analysis™ Pro  
Vernier Spectral Analysis®  
Vernier Video Analysis®

### Lab Book

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 across your department.

LQ

## What You Need to Get Started with LabQuest Sensors

### LabQuest Sensor

LabQuest sensors share data with your device via a wired connection (BTA/BTD) to an interface from the LabQuest family.

### Interface

An interface sends information from the sensor to the data-collection and analysis software. The LabQuest family includes LabQuest 3, LabQuest Stream®, and LabQuest Mini.

### Device

LabQuest sensors connect to computers, Chromebooks, and compatible mobile devices through a LabQuest interface.

### Software

Vernier Graphical Analysis Pro  
LabQuest App

### Lab Book

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 across your department.

## Software

### Vernier Spectral Analysis

GDX

Spectral Analysis supports our family of spectrometers. The user-friendly interface walks students through the data-collection process and includes analysis features such as curve fitting and data interpolation.

### Vernier Video Analysis

Students can use their smartphone or tablet in the laboratory or out in the field to record motion. They can then import the video into Video Analysis on any device to mark the object in motion, set the scale, and create graphs of the motion.

### LabQuest App

GDX

LQ

LabQuest 3 has built-in software that gives your students real-time graphing capabilities in a handheld device.

### Vernier Graphical Analysis Pro

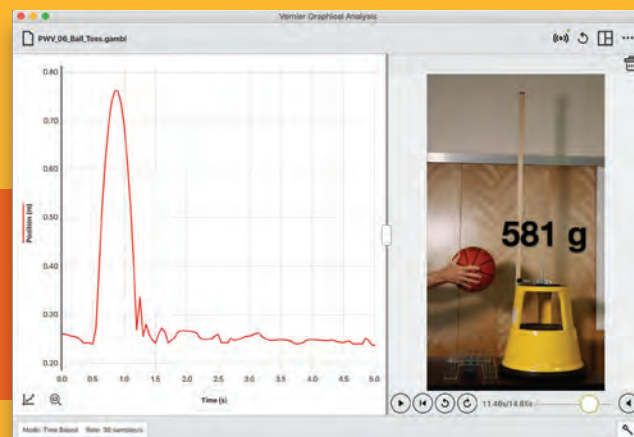
GDX

LQ

Our award-winning app enables advanced data analysis, provides opportunities to reinforce and extend learning, and includes features that support hybrid teaching models.

### Free Trial for Educators

Try out Graphical Analysis Pro for free for 30 days. Access the sample experiments and enhanced analysis tools to use with your students.  
**Get a free trial and learn about site license options at [www.vernier.com/graphical-analysis](http://www.vernier.com/graphical-analysis)**



Free 30-Day  
Preview

Not sure if our technology is right for your laboratory? Our risk-free preview program makes it easier to decide. Most Vernier products are available for a 30-day preview (or longer, if requested) to educational institutions.

# Mechanics

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

GDX

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

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

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

Additional Cart and Track options are available at [vernier.com/dynamics](http://vernier.com/dynamics)



## Go Direct Photogate

GDX

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 Force and Acceleration

GDX

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. It also includes a 3-axis gyroscope for experiments involving rotation.

GDX-FOR \$119

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



## Go Direct Centripetal Force Apparatus

GDX

When combined with Go Direct Force and Acceleration (not included), the Centripetal Force Apparatus makes an ideal tool to explore rotational dynamics.

GDX-CFA \$325

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



## Moment of Inertia Accessory Kit

GDX

LQ

With the Moment of Inertia Accessory Kit, students can explore inertia in a broader context. The kit expands the capabilities of the Vernier Centripetal Force Apparatus when investigating moments of inertia of different geometries.

CFA-MIK \$199

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



## Go Direct Motion

GDX

Use ultrasound to measure the position, velocity, and acceleration of moving objects.

GDX-MD \$114

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



## Vernier Video Analysis App

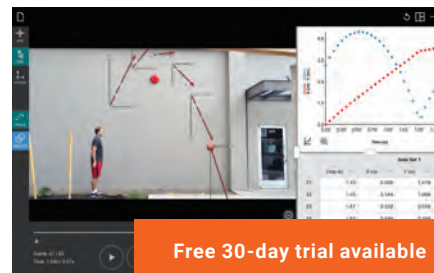
Students can use their smartphones and tablets in the laboratory or out in the field to capture motion. Once the video is inserted into the app, students set the scale and mark points within the video to track the object in motion. Vernier Video Analysis generates accurate, visually rich graphs and a data table that reflects the recorded motion.

Video Analysis is a browser-based app that works on Windows®, macOS®, Android™, ChromeOS™, iOS, and iPadOS®.



## Investigations for Vernier Video Analysis

Each e-book includes investigations for use with Vernier Video Analysis, including ready-to-use videos.



Free 30-day trial available  
[vernier.com/video-analysis](http://vernier.com/video-analysis)

Vernier Video Analysis: Motion and Sports  
Download only: HSB-VVAMS-E \$28

Vernier Video Analysis:  
Conservation Laws and Forces  
Download only: HSB-VVACLF-E \$28

# Waves and Sound

## Go Direct Sound

GDX

This is really two sensors in one—measure sound level in decibels, or capture and evaluate sound waveforms.

GDX-SND \$95

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



## Power Amplifier

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

PAMP \$249

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



## Power Amplifier Accessory Speaker

Study mechanical waves on strings and springs.

PAAS-PAMP ⬆ \$135

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



# Thermodynamics

## Go Direct Gas Pressure

GDX

This sensor measures the absolute pressure of a gas.

GDX-GP \$99

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



## Go Direct Temperature

GDX

Go Direct® Temperature is a durable, stainless steel temperature sensor for use in liquids or air.

Range: -40 to 125°C

GDX-TMP \$78

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



## Go Direct Surface Temperature

GDX

An exposed temperature sensor makes this an ideal choice for situations where low thermal mass and extremely rapid response are needed. Use in air and water only.

Range: -25 to 125°C

GDX-ST \$99

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



## FLIR ONE Gen 3 Thermal Camera

Reveal the hidden world of infrared vision. When used with our Vernier Thermal Analysis® Plus app, students can also collect temperature vs. time data for up to four points or regions, along with a thermal image video.

FLIRPRO-IOS ⬆ \$399

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

## Vernier Thermal Analysis Plus App

This iOS and iPadOS® app enables graphing temperature vs. time for up to four points or regions when using a FLIR ONE® camera.

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





# Electricity and Magnetism

## Go Direct Voltage

GDX

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.

Ranges:  $\pm 20$  V and  $\pm 1$  V

GDX-VOLT \$79

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



## Go Direct Current

GDX

Measure electric currents in circuits with this versatile sensor.

Ranges:  $\pm 1$  A and  $\pm 0.1$  A

GDX-CUR \$89

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



## Go Direct Static Charge

GDX

With Go Direct Static Charge, students can easily perform quantitative measurements of static charges. Designed with ease of use in mind, this wireless sensor ensures enhanced accuracy and performance.

Range:  $\pm 100$  nC

GDX-Q \$109

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



## Go Direct 3-Axis Magnetic Field

GDX

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

Ranges:  $\pm 5$  mT and  $\pm 130$  mT

GDX-3MG \$75

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



## Electrostatics Kit

When using the Electrostatics Kit with Go Direct Static Charge, students can conduct a range of experiments in electrostatics.

ESK-CRG \$129

[vernier.com/esk-crg](http://vernier.com/esk-crg)



## High-Voltage Electrostatics Kit

Use this kit to investigate the distribution of charge on a sphere, transfer of charge on contact between two spheres, and charging by induction.

HVEK-CRG \$299

[vernier.com/hvek-crg](http://vernier.com/hvek-crg)



## Extech® Digital Power Supply

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

EXPS \$259

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



## 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, and additional components can be added to expand the capability of this useful board.

VCB2 \$145

[vernier.com/vcb2](http://vernier.com/vcb2)



## Electrostatic High-Voltage Genecon

A great addition to the High Voltage Electrostatics Kit, the Electrostatic High-Voltage Genecon generates both positive and negative charges and reliably creates charge differences in high humidity.

HVEK-GEN \$229

[vernier.com/hvek-gen](http://vernier.com/hvek-gen)



# Light and Optics

## Light Sensors

### Go Direct Light and Color

GDX

This sensor combines visible light, UV, and RGB sensors to measure source emission, transmittance, and reflection of light in the visible light to ultraviolet electromagnetic spectrum.

GDX-LC \$89

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



### Light Sensor\*

LQ

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)



LQ

## Diffraction Apparatus<sup>‡</sup>

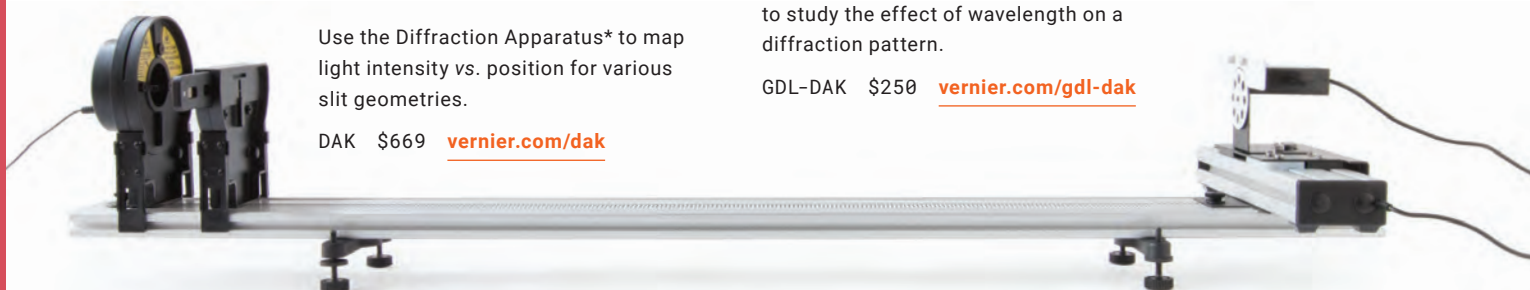
Use the Diffraction Apparatus\* to map light intensity vs. position for various slit geometries.

DAK \$669 [vernier.com/dak](http://vernier.com/dak)

### Green Diffraction Laser (optional)

Add this laser 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)



## Optics Expansion Kit

GDX LQ

Use the Optics Expansion Kit<sup>‡</sup> with your dynamics track 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 experiments in our *Physics with Vernier* and *Advanced Physics with Vernier—Beyond Mechanics* lab books.

OEK \$199

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

See website for replacement parts.

## Accessories

### Color Mixer Kit<sup>‡</sup>

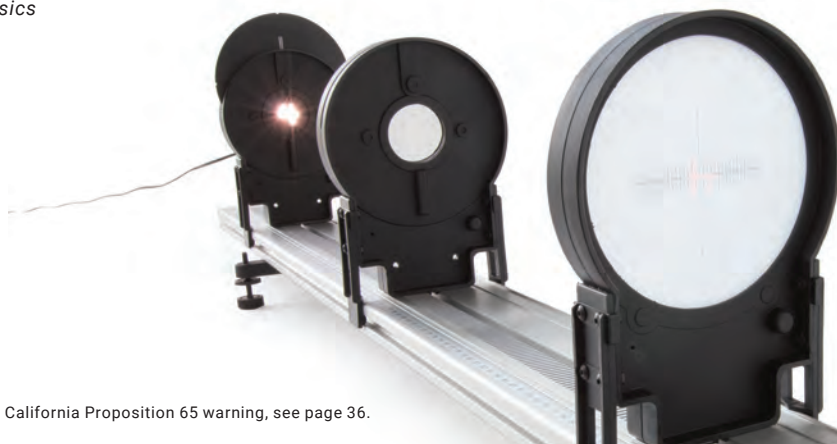
CM-OEK \$179 [vernier.com/cm-oek](http://vernier.com/cm-oek)

### Mirror Set<sup>‡</sup>

M-OEK \$69 [vernier.com/m-oek](http://vernier.com/m-oek)

### Polarizer/Analyzer Set<sup>‡</sup>

PAK-OEK \$89 [vernier.com/pak-oek](http://vernier.com/pak-oek)



\* Requires an interface such as LabQuest® 3 or LabQuest Mini

‡ Requires a Combination 1.2 m Track/Optics Bench (TRACK, \$145)

# Modern Physics

## Radiation Monitors

Our radiation monitors detect alpha, beta, gamma, and X-ray radiation. They can be used to explore radiation statistics, measure the rate of nuclear decay, monitor radon progeny, and investigate the effects of shielding. The sensors include both LED and audible indicators.

### Go Direct Radiation Monitor

GDX

GDX-RAD \$199

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



### Vernier Radiation Monitor\*

LQ

VRM-BTD \$199

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



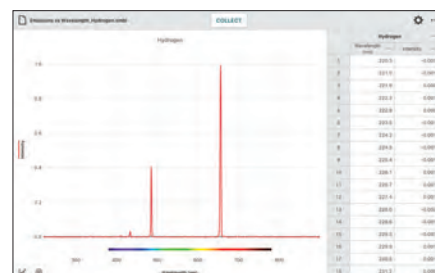
## Go Direct Emissions Spectrometer

GDX

The Go Direct® 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 the Vernier Emissions 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 Spectral Analysis App

Our free Vernier Spectral Analysis® app combined with our Emissions Spectrometer makes it easy to analyze spectra. Students can quickly locate peaks or compare spectra from different sources.

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

### Vernier Emissions Fiber

VSP-EM-FIBER \$94

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



## Spectrum Tube Power Supply

This power supply features an ultra-safe design for electrifying spectrum tubes.

ST-SPS ⚡ \$279

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



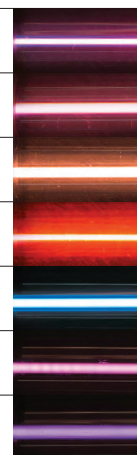
## Spectrum Tubes

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

Spectrum Tubes carry a warranty of 2 years or 100 hours, whichever comes first (hydrogen tube: 2 years or 40 hours, whichever comes first).

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

Spectrum Tube	Order Code	Price
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



# Additional Physics Products

## Mechanics

Product	Order Code	Price
Go Direct® Acceleration	GDX-ACC	\$109
3-Axis Accelerometer	3D-BTA	\$105
25-g Accelerometer	ACC-BTA	\$110
Bumper and Launcher Kit	BLK	\$99
Dual-Range Force Sensor	DFS-BTA	\$120
Dynamics Cart and Track System	DTS	\$349
Dynamics Cart and Track System with Motion Encoder	DTS-EC	\$513
Eddy Current Brake	DTS-ECB	\$19
Encoder Fan Cart	CART-FEC	\$235
Fan Cart	CART-F	\$119
Force Plate	FP-BTA	\$319
Friction Pad DTS	DTS-PAD	\$32
Independence of Motion	IOM-VPL	\$59
Go Direct Sensor Cart Accessory Kit	GDX-CART-AK	\$58
Low-g Accelerometer	LGA-BTA	\$99
Motion Detector	MD-BTD	\$99
Photogate	VPG-BTD	\$55
Go Direct Projectile Launcher	GDX-PL	\$489
Vernier Projectile Launcher	VPL	\$440
Projectile Stop	PS-VPL	\$40
Pulley Bracket	B-SPA	\$12
Go Direct Rotary Motion ⚡	GDX-RMS	\$189
Rotary Motion Sensor ⚡	RMV-BTD	\$189
Rotational Motion Accessory Kit ⚡	AK-RMV	\$120
Time of Flight Pad	TOF-VPL	\$84
Ultra Pulley Attachment	SPA	\$24

## Waves and Sound

Product	Order Code	Price
Microphone	MCA-BTA	\$55
Sound Level Sensor	SLS-BTA	\$69

## Thermodynamics

Product	Order Code	Price
FLIR ONE® Pro Thermal Camera ⚡	FLIRPRO-IOS	\$399
FLIR ONE Pro LT for iOS Thermal Camera ⚡	FLIRLT-IOS	\$299
Gas Pressure Sensor	GPS-BTA	\$94
Stainless Steel Temperature Probe	TMP-BTA	\$40
Surface Temperature Sensor	STS-BTA	\$34

## Electricity and Magnetism

Product	Order Code	Price
Magnetic Field Sensor	MG-BTA	\$69
Power Amplifier	PAMP	\$249
Differential Voltage Probe	DVP-BTA	\$49
Current Probe	DCP-BTA	\$49
Instrumentation Amplifier	INA-BTA	\$89
Optional Breadboard Kit for the Vernier Circuit Board 2	VCB2-0BBK	\$29
Extech® Digital DC Power Supply	EXPS	\$259
Charge Sensor	CRG-BTA	\$89

## Light and Optics

Product	Order Code	Price
Polarizer/Analyzer Set for Optics Expansion Kit	PAK-OEK	\$89
Combination 1.2 m Track/Optics Bench	TRACK	\$155
Combination 2.2 m Track/Optics Bench	TRACK-LONG	\$264
Green Diffraction Laser	GDL-DAK	\$250

## Lab Books

Product	Order Code	Price
<i>Physics with Vernier</i>	PWV*	\$52
<i>Advanced Physics with Vernier—Mechanics</i>	PHYS-AM*	\$52
<i>Advanced Physics with Vernier—Beyond Mechanics</i>	PHYS-ABM*	\$52
<i>Physics Explorations and Projects</i>	PEP*	\$52
<i>Vernier Video Analysis: Motion and Sports</i>	HSB-VVAMS-E	\$28
<i>Vernier Video Analysis: Conservation Laws and Forces</i>	HSB-VVACLF-E	\$28

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

This is just a sample of our physics solutions.  
To see the full suite of Vernier physics products,  
please visit [vernier.com/physics](https://www.vernier.com/physics)



# Engineering

## Why Vernier?

Vernier engineering solutions harness the power of analytical software and the precision of high-quality sensors to help students sharpen their design skills and prepare to enter the workforce. As with all of our solutions, our engineering technology is backed by unparalleled support.

### Quality

Durable hardware for lab and field use

### Affordable

Designed for education and education budgets

### Versatile

Supports a variety of devices and experiments



“ Our projects are about more than just supporting the need for engineering education in local classrooms. Vernier products help deepen our students' learning through experiential, hands-on community engagement.

*Maija A. Benitz, PhD  
Assistant Professor of Engineering  
Roger Williams University*

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

# A Guide to Vernier Data Collection

We're here to support you as an educator as you incorporate data-collection technology into your instruction. See how our products provide you with affordable laboratory solutions designed for student success.

Our Guarantee: Most of our products are protected by a 5-year limited warranty. And after five years? We'll make every attempt to repair your equipment.

GDX

## What You Need to Get Started with Go Direct Sensors

Go Direct® sensors connect directly (no interface required) to your computer, Chromebook™, or compatible mobile device via USB or Bluetooth® wireless technology.

### A Go Direct sensor

### B Computer, Chromebook, tablet, smartphone

### C Software

- Vernier Graphical Analysis Pro™
- National Instruments LabVIEW™
- Python®
- JavaScript™

LQ

## What You Need to Get Started with LabQuest Sensors

LabQuest® sensors have a cable with a plug that makes it easy to connect to an interface without any additional wiring. Use LabQuest sensors with a Vernier interface, Arduino®, NI ELVIS, NI myDAQ, or your own DAQ hardware. If using a non-Vernier interface, these sensors require a +5.0 volt supply voltage and output a 0 to 5 volt signal. Most sensors have a simple, linear calibration.

### A LabQuest sensor

### B Interface (LabQuest, DAQ, or Arduino)

### C Computer, Chromebook, tablet, smartphone

### D Software

- Vernier Graphical Analysis Pro
- National Instruments LabVIEW
- Arduino IDE
- Python

# Vernier Graphical Analysis Pro

Our award-winning app enables advanced data analysis, provides opportunities to reinforce and extend learning, and includes features that support hybrid teaching models.

GDX

LQ

## Free Trial for Educators

Try out Graphical Analysis Pro for free for 30 days. Access the sample experiments and enhanced analysis tools to use with your students.

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



Free 30-Day  
Preview

Not sure if our technology is right for your laboratory? Our risk-free preview program makes it easier to decide. Most Vernier products are available for a 30-day preview (or longer, if requested) to educational institutions.

# Introduction to Engineering

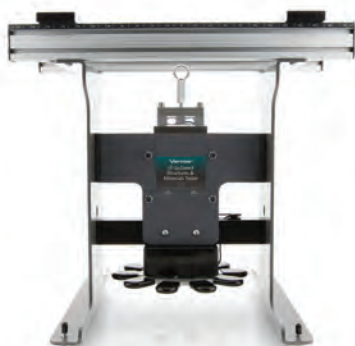
## Go Direct Structures & Materials Tester

GDX

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.

GDX-VSMT \$1,199

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



## Advanced Wind Experiment Kit

Use this kit as a fast and easy way to introduce the engineering aspects of wind turbine technology. Investigate different blade designs, gear ratios, and generators.

KW-AWX \$174

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



## Vernier Variable Load

Use the Vernier Variable Load in conjunction with Go Direct Energy to provide a range of resistive loads for projects such as engineering wind turbines or investigating solar panels. Students can adjust the potentiometer to provide resistances between 6 and 255  $\Omega$  to determine the optimal load on a system.

VES-VL \$74 [vernier.com/ves-vl](http://vernier.com/ves-vl)



## Go Direct Energy

GDX

Go Direct Energy measures voltage and current as well as displays power and energy output of scale model wind turbines and solar panels, so students can quantitatively evaluate the effects of their design changes. It connects via Bluetooth wireless technology or USB to your device.

GDX-NRG \$98 [vernier.com/gdx-nrg](http://vernier.com/gdx-nrg)



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

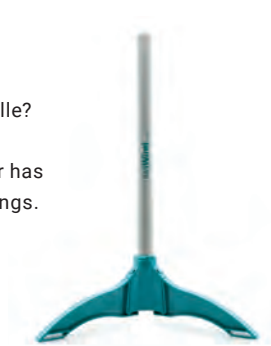
# Wind Turbine Design

## Tower and Base Set

Do you need a tower for your turbine nacelle? This is the same tower that comes in the Advanced Wind Experiment Kit. The tower has a diameter that fits inside 1-inch PVC fittings.

KW-TBS \$29

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



## Basic Turbine Building Parts

The Basic Turbine Building Parts kit includes three hubs, a wind turbine generator, and 25 dowels, all in one package.

KW-BTPART \$16

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



## Wind Turbine Generator with Wires

This is the primary generator for wind turbine experiments because it runs smoothly and provides high power output at a relatively low RPM.

KW-GEN \$7

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



## Hub (3 Pack)

With these 12-hole crimping hubs, made from recycled plastic, students can turn a DC generator into a wind turbine.

KW-WTH3 \$22

[vernier.com/kw-wth3](http://vernier.com/kw-wth3)



## Nacelle

Build a complete turbine by making your own tower and base with PVC pipe (from a hardware store) or use the Tower and Base Set. You will also need a generator and a way to affix the turbine blades.

KW-NAC \$18

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



## simpleGEN

Students can use the easy-to-build AC generator of the simpleGEN to explore the basics of electrical generator design.

KW-SGEN \$69

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



## Gear Set

The small 8-tooth gear fits on 2 mm driveshafts that are found on many DC generators. The gears have a keying feature and can be changed quickly and easily using the included hex locks. The hex locks secure to our 9/64 inch hex driveshaft, which is included in the Drivetrain Set (KW-DS, \$8).

Gear sizes: 64 teeth, 32 teeth, 16 teeth, 8 teeth

KW-GEAR \$9

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



## KidWind Photogate Bracket

The KidWind Photogate Bracket enables the measurement of rotations per minute (RPMs) of a wind turbine with a Vernier photogate.

KW-PGBRAC \$12

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





## Biomedical Engineering with Go Direct Sensors

With wireless options and multiple on-board sensors, Go Direct sensors are perfect for analyzing and studying physiological functions.

GDX

### Go Direct EKG

Go Direct® EKG has five channels: EKG, heart rate, EMG, EMG rectified, and voltage.

GDX-EKG \$169

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



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

This sensor measures gaseous oxygen concentration levels and air temperature.

GDX-O2 \$205

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



### Go Direct Blood Pressure

Go Direct Blood Pressure has seven channels: cuff pressure, mean arterial pressure, systolic pressure, diastolic pressure, pulse rate, oscillations, and envelope.

GDX-BP \$125

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



### Go Direct Temperature

This rugged, general purpose sensor has a temperature range of -40 to 125°C.

GDX-TMP \$78

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



### Go Direct Spirometer

Go Direct Spirometer has six channels: flow rate, volume, adjusted volume, cycle volume, respiration rate, and differential pressure.

GDX-SPR \$219

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



### Go Direct Surface Temperature

With a range of -25 to 125°C, this sensor is designed for use in situations in which low thermal mass or flexibility is required, such as on human skin.

GDX-ST \$99

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



### Go Direct Hand Dynamometer

Go Direct Hand Dynamometer has seven channels: force, x-axis acceleration, y-axis acceleration, z-axis acceleration, x-axis gyro, y-axis gyro, and z-axis gyro.

GDX-HD \$119

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



### Go Direct Respiration Belt

Go Direct Respiration Belt has four channels: force, respiration rate, steps, and step rate.

GDX-RB \$109

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



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

Go Direct CO<sub>2</sub> Gas has three channels: CO<sub>2</sub> gas, temperature, and relative humidity.

GDX-CO2 \$225

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



### Go Direct Acceleration

This 3-axis acceleration sensor has two acceleration ranges ( $\pm 157 \text{ m/s}^2$  and  $\pm 1960 \text{ m/s}^2$ ) plus an altimeter and a 3-axis gyroscope.

GDX-ACC \$109

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



# Arduino with LabQuest Sensors

LQ

Help students build coding skills and foster creative critical thinking by combining Vernier sensors with Arduino.®

## Vernier Coding with Arduino—Analog Sensor Package

The package has everything needed for students to use Vernier sensors with Arduino microcontrollers, including the *Vernier Coding Activities with Arduino: Analog Sensors* e-book at no additional cost.

VCA-AS-PKG \$148 [vernier.com/vca-as-pkg](http://vernier.com/vca-as-pkg)



## SparkFun RedBoard with Cable

This Arduino-compatible board makes it easy to take sensor measurements when used with the Vernier Arduino Interface Shield.

ARD-RED \$25 [vernier.com/ard-red](http://vernier.com/ard-red)



## Vernier Arduino Interface Shield

Conveniently connect the SparkFun® RedBoard or Arduino Uno to Vernier LabQuest® sensors with the Vernier Arduino Interface Shield.

BT-ARD \$29 [vernier.com/bt-ard](http://vernier.com/bt-ard)



## Gas Pressure Sensor

Use the Gas Pressure Sensor to monitor pressure changes of a gas.

GPS-BTA \$94 [vernier.com/gps-bta](http://vernier.com/gps-bta)



## Surface Temperature Sensor

Measure temperature where low thermal mass or flexibility is required.

Range: -25 to 125°C

STS-BTA \$34 [vernier.com/sts-bta](http://vernier.com/sts-bta)



## Motion Detector

The Motion Detector uses ultrasound to measure the position of objects.

Range: 0.15 to 6 m

Resolution: 1 mm

MD-BTD \$99 [vernier.com/md-btd](http://vernier.com/md-btd)



## pH Sensor

This is a general-purpose pH sensor.

Range: pH 0 to 14

Accuracy: ±0.2 pH units

PH-BTA \$99 [vernier.com/ph-bta](http://vernier.com/ph-bta)



## Digital Control Unit

Use the digital output lines of an interface to control DC electrical devices.

DCU-BTD \$69 [vernier.com/dcu-btd](http://vernier.com/dcu-btd)



## Anemometer

This is an impeller-type anemometer for measuring wind speed.

Range: 0.5 to 30 m/s (1 to 67 mph)

ANM-BTA \$109 [vernier.com/anm-bta](http://vernier.com/anm-bta)



Read the online guide and see all our products for Arduino at [vernier.com/arduino](http://vernier.com/arduino)

## Sensors and Coding

Students gain a deeper understanding of coding when they see their code interact with sensor data. Our coding solutions give students valuable experience using popular programming languages to affect things beyond the screen.



## LabVIEW

Use our free activity book to introduce NI LabVIEW™ programming with Vernier sensors in your classroom.

[vernier.com/ni-labview](http://vernier.com/ni-labview)

# National Instruments LabVIEW and Vernier

Introduce your students to NI LabVIEW software, a programming language used throughout the engineering disciplines. We have sample LabVIEW programs (VIs) for LabQuest Mini, myDAQ, Go Direct® sensors, and other Vernier hardware.

## With LabQuest Sensors

LQ



### myDAQ Adapter

The myDAQ Adapter can be used to perform data acquisition with more than 75 Vernier LabQuest sensors and the NI myDAQ interface (sold separately). It is designed for use with NI LabVIEW software.

BT-MDAQ \$69

[vernier.com/bt-mdaq](http://vernier.com/bt-mdaq)


### Analog Protoboard Adapter

Use these adapters to connect Vernier LabQuest sensors to a non-Vernier interface, such as NI ELVIS. The connector fits into a standard prototyping board.

BTA-ELV \$12

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


### LabQuest Mini

LabQuest Mini is a powerful, affordable, and easy-to-use sensor interface for data acquisition with more than 75 Vernier LabQuest sensors.

LQ-MINI \$189

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

## With Go Direct Sensors

GDX

Integrate over 50 wireless sensors into your LabVIEW project to acquire data or control your NI DAQ hardware.

### Go Direct Acceleration

GDX-ACC \$109 [vernier.com/gdx-acc](http://vernier.com/gdx-acc)

### Go Direct Motion

GDX-MD \$114 [vernier.com/gdx-md](http://vernier.com/gdx-md)

### Go Direct Force and Acceleration

GDX-FOR \$119 [vernier.com/gdx-for](http://vernier.com/gdx-for)

### Go Direct Light and Color

GDX-LC \$89 [vernier.com/gdx-lc](http://vernier.com/gdx-lc)

### Go Direct Rotary Motion

GDX-RMS ⚡ \$189 [vernier.com/gdx-rms](http://vernier.com/gdx-rms)

### Go Direct Weather

GDX-WTHR \$109 [vernier.com/gdx-wthr](http://vernier.com/gdx-wthr)

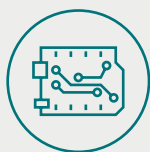
See all our products for NI LabVIEW at [vernier.com/ni-labview](http://vernier.com/ni-labview)

⚡ For California Proposition 65 warning, see page 36.



## Python and VPython

We have created a guide and examples that make it easy to start using Vernier sensors with Python® and VPython.

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


## Arduino IDE

Use our starter package to teach the basics of coding Arduino with Vernier sensors.

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


## JavaScript

Students can use JavaScript™ to integrate Go Direct sensor data into their custom web applications.

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

# Engineering Products


## Wind Turbine Design

Product	Order Code	Price
Advanced Wind Experiment Kit	KW-AWX	\$174
Balsa Blade Sheets (10 Sheets)	KW-BBS10	\$12
Basic Turbine Building Parts	KW-BTPART	\$16
Drivetrain Set	KW-DS	\$8
Gear Set	KW-GEAR	\$9
Go Direct® Energy	GDX-NRG	\$98
Hub (3 Pack)	KW-WTH3	\$22
KidWind Photogate Bracket	KW-PGBRAC	\$12
Nacelle	KW-NAC	\$18
Tower and Base Set	KW-TBS	\$29
Vernier Variable Load	VES-VL	\$74
Wind Turbine Generator with Wires	KW-GEN	\$7

## Engineering with Arduino

Product	Order Code	Price
Anemometer	ANM-BTA	\$109
Digital Control Unit	DCU-BTD	\$69
Gas Pressure Sensor	GPS-BTA	\$94
Motion Detector	MD-BTD	\$99
pH Sensor	PH-BTA	\$99
SparkFun RedBoard with Cable	ARD-RED	\$25
Surface Temperature Sensor	STS-BTA	\$34
Vernier Arduino Interface Shield	BT-ARD	\$29
Vernier Coding Activities with Arduino: Analog Sensors lab book	VCA-AS-E	\$22

## LabQuest Sensors

Product	Order Code	Price
Barometer	BAR-BTA	\$79
Gas Pressure Sensor	GPS-BTA	\$94
Light Sensor 	LS-BTA	\$69
Magnetic Field Sensor	MG-BTA	\$69
Microphone	MCA-BTA	\$55
Soil Moisture Sensor	SMS-BTA	\$129
Stainless Steel Temperature Probe	TMP-BTA	\$40

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


## Biomedical Engineering

Product	Order Code	Price
Go Direct Acceleration	GDX-ACC	\$109
Go Direct Blood Pressure	GDX-BP	\$125
Go Direct CO <sub>2</sub> Gas	GDX-CO2	\$225
Go Direct EKG	GDX-EKG	\$169
Go Direct Hand Dynamometer	GDX-HD	\$119
Go Direct O <sub>2</sub> Gas	GDX-O2	\$205
Go Direct Respiration Belt	GDX-RB	\$109
Go Direct Spirometer	GDX-SPR	\$219
Go Direct Surface Temperature	GDX-ST	\$99
Go Direct Temperature	GDX-TMP	\$78

## NI LabVIEW and Vernier

Product	Order Code	Price
Analog Protoboard Adapter	BTA-ELV	\$12
myDAQ Adapter	BT-MDAQ	\$69
LabQuest® Mini	LQ-MINI	\$189

## Go Direct Sensors

Product	Order Code	Price
Go Direct Acceleration	GDX-ACC	\$109
Go Direct Force and Acceleration	GDX-FOR	\$119
Go Direct Light and Color	GDX-LC	\$89
Go Direct Motion	GDX-MD	\$114
Go Direct Rotary Motion 	GDX-RMS	\$189

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