PASCO®

Celebrating 60 Years of Innovation

SCIENCE & TECHNOLOGY

Biology ● Chemistry ● Environmental ● Physics

Featuring!

- Wireless Sensors
- STEM Solutions
- Lab Bundles
- Curriculum
- And More

TRANSFORMING SCIENCE & STEM EDUCATION

NEW!

Wireless Dissolved Oxygen Sensor & Photosynthesis Chamber

(page 45)

FREE! SPARKvue Software

Award-Winning Software Free for All Devices

(pages 4-5)

60 YEARS OF INNOVATION

PASCO is Celebrating 60 Years of Innovation in Science Education

60 years ago, PASCO scientific introduced its first product, the Millikan Oil Drop Experiment, that had its origins as a high school science project. Amazingly, schools ordered this apparatus from a company they had never heard of – displaying a great amount of trust in a new company.

And for the past 60 years, high schools and colleges have continued to place their trust in the apparatus we design, manufacture, sell and support. For that trust over the years, we simply say, ***"Thank You!"*** With your continued support and suggestions, we will strive to maintain that trust into the future.

What have we been doing for the past 60 years? I invite you to peruse our catalog and see the hundreds of products that bear the name PASCO.

PASCO capstone™

NEW! **Standard Compound Optical Microscope.**
(Page 51)

NEW! **Melting Point Apparatus**
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NEW! **Motorized Structures Systems**
(Pages 31-35)

Sensor Technology

Our innovative, award-winning wireless sensors are rugged, low-cost, and easy to use. Explore our growing line of more than 30 wireless sensors!

Data Collection & Analysis Software

Intuitive SPARKvue® works on iOS, Android™, and Chrome™ devices, as well as Mac® and Windows® computers. It even includes Blockly block-based coding, which allows students to code with any PASCO sensor.

Complete Lab Stations

PASCO Lab Stations make it easy to use sensor-based technology in your science classroom. Discover Lab Stations for Biology, Chemistry, Agricultural Science, Physics, Middle School Science, and K-5 Science.

Curriculum Solutions

The Essential curriculums are the only curricular solutions that include a Student Textbook, an e-Book, Teacher e-Resources, Lab Manuals, and award-winning equipment kits.

STEM & Coding Solutions

STEM Sense solutions promote early excellence in science and STEM education with cross-curricular investigations that help young learners build strong foundations in science, programming and data literacy.

Storage & Classroom Management

Use these rolling carts and storage trays to decrease your classroom management time and increase teaching and learning time.

Sensor Technology

PASCO's award-winning line of wireless sensors are durably designed, easy to use, and affordably priced to help educators bring real-world technology into the hands of students everywhere. Our wireless sensors feature student-friendly designs, manual and automated data collection, interactive displays and other modern features that enhance science learning. Plus, they connect directly to computers, Chromebooks, tablets, and mobile devices, allowing students to quickly collect data, so they can spend more time analyzing and interpreting their results.

- Original PASCO innovations, such as the //code.Node, Smart Cart, Modular Circuits and Wireless Weather Sensor with GPS
- Award-winning software supports Blockly coding for every sensor
- Onboard sensor memory with Logging Mode for long-term experiments
- Hundreds of free labs available for download from our online Experiment Library
- PASCO-ensured quality and backed by our five-year warranty

Wireless Weather Sensor with GPS

Capable of making 19 measurements and logging GPS data, this all-in-one instrument is ideal for investigating complex environmental conditions.

Wireless Motion Sensor

This sensor measures the position, velocity, and acceleration of objects, and it even includes a 180° rotatable head for creative applications.

Wireless Smart Cart Patent Number 10,481,173

Upgrade to the revolutionary Wireless Smart Cart and start collecting live data for position, velocity, acceleration, force, and rotation directly on your device.

Wireless CO_2 Sensor

Use this sensor to explore respiration and photosynthesis, chemical reactions, and so much more with real-time CO_2 data on your device.

Wireless Colorimeter and Turbidity Sensor

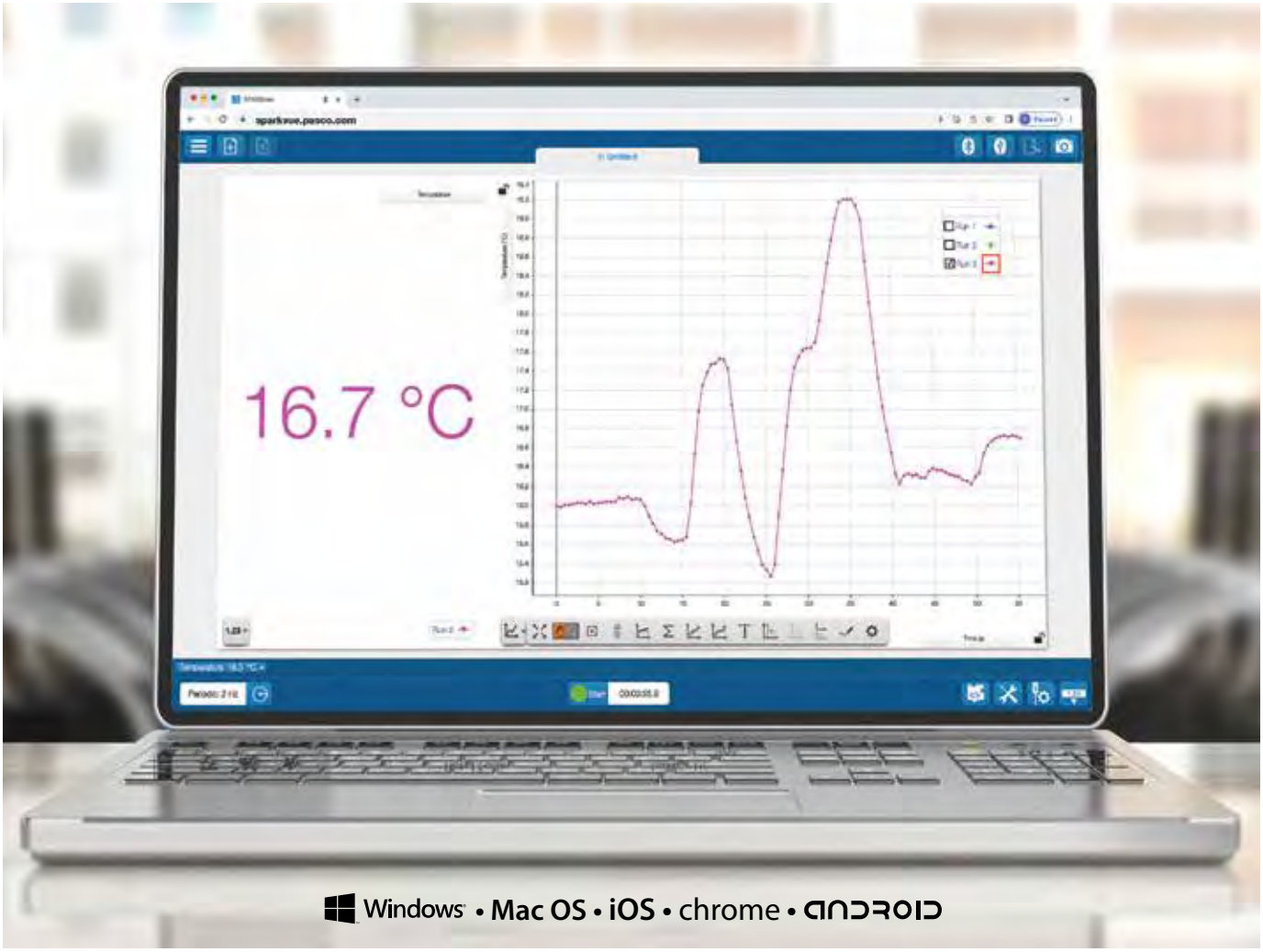
This dynamic sensor simultaneously measures a sample's absorbance and transmittance at six different wavelengths, and it doubles as a turbidity sensor for water quality investigations.

Wireless Temperature Sensor

A staple of every science class, this sensor drastically simplifies temperature measurements with its small footprint, long-lasting battery, and live datalogging.

Our growing line now includes over 30 wireless sensors!

Data Collection and Coding

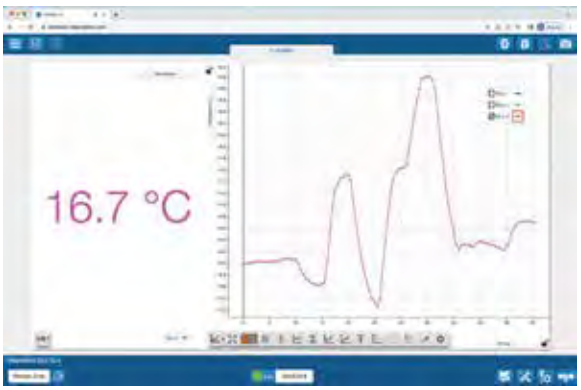


SPARKvue

This FREE award-winning data collection and analysis software works on any platform!

SPARKvue's intuitive design has made it an award-winning tool for collecting and analyzing experimental data. The user-friendly platform optimizes data collection and provides tools for in-depth analysis within a compact, yet powerful workspace.

SPARKvue features Blockly coding, allowing students to use block-based code for sense and control of PASCO devices, including any of our sensors.

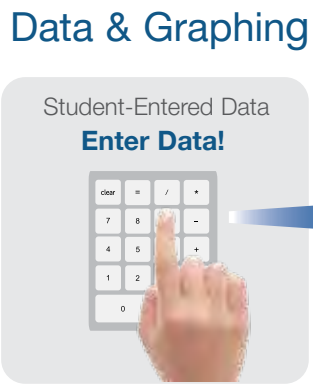


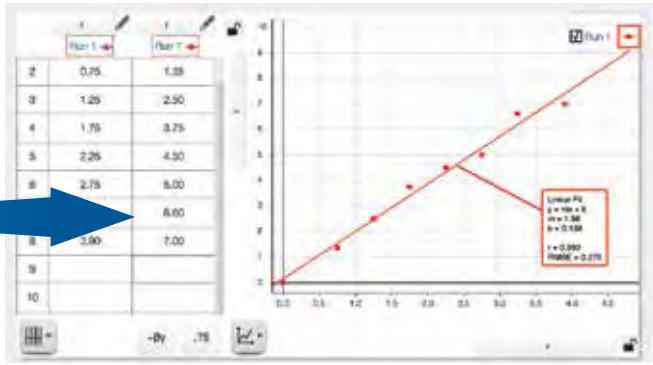
Student Data Collection...**MADE EASY!**

Student-Entered Data & Graphing **MADE EASY!**

Choose manual data collection to record live values with the click of a button.

Make a mistake? No problem! Simply select a data point to replace it.



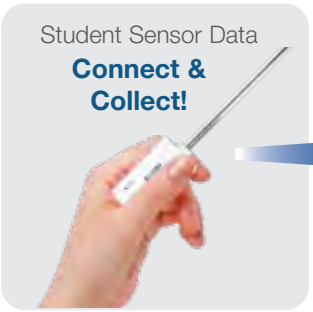


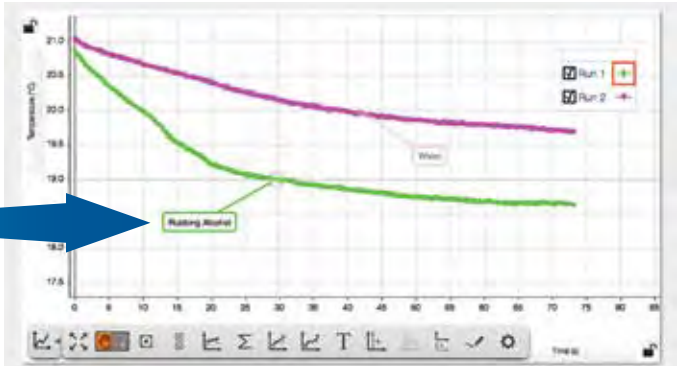
Graph & Analyze Student-Entered Data

Collecting & Graphing *Sensor* Data **MADE EASY!**

Automate sensor data collection to monitor measurements in real time.

Save time with pre-made experiment files, or build your own with drag-and-drop displays that'll have you up and running in minutes.





Rapid, Real-Time Data Collection & Analysis

Digits Display

Bar Graph Display

Meter Display

GIS Map Display

Free award winning data collection and analysis software now runs in your browser!

We're excited to announce SPARKvue is now available **FREE** of charge on all your devices as a browser-based application. This new version of our software as a Progressive Web Application (PWA) means you have free access to all the features of SPARKvue from Google Chrome and Microsoft Edge browsers. That's right: No download fees, subscription fees, or update fees, even for Windows® and Mac®. Plus, the app is always updated to the latest version automatically, so you never have to worry about it.

Go to sparkvue.pasco.com to access the PWA. SPARKvue is also available as a **FREE** app for Chromebook™, iPad®, Android™ tablets, and Apple® and Android™ smartphones.

SPARKvue® Launch now as a Web App PWA + Download on the App Store | Available in the Chrome Web Store | ANDROID APP ON Google play

Looking for additional options? See pasco.com/sparkvue for more details.

Science Lab Stations & Bundles

PASCO's Lab Stations make it easy and affordable to begin using sensor-based technology in your K-8, Biology, Chemistry and Environmental classrooms. Convenient Physics equipment bundles include equipment and sensor technology and are complemented by a collection of ready-made experiments.

Elementary Science Starter Lab Station

PS-3314

Inspire a lifelong love of science, while nurturing the development of foundational STEM skills with our new Elementary Science Lab Stations (page 9).

Middle School Science Starter Lab Station

PS-3312

Help prepare your middle school students for high school science with our ready-to-use Middle School Science Lab Stations (page 10).

Biology Starter Lab Station

EB-6334

Make the integration of phenomena-based investigations into your Biology course seamless with our complete Biology Lab Stations. Includes sensors, labs, and more (page 37).

Chemistry Starter Lab Station

EC-6362

Empower students to investigate chemical phenomena like never before with sensors, labs, and apparatus that make chemical concepts more meaningful (page 53).

Agricultural Science Starter Lab Station

EB-6336

Transform your classroom into an outdoor field site with our new Agricultural Science Lab Stations. Includes sensors, labs, and more (page 75).

Physics Lab Bundles

Support hands-on physics learning all year long with our new Physics bundles, complete with sensors, labs, and more (page 86-91).

Curriculum Solutions

Essential Physics & Essential Chemistry (See pages 54 and 92)

PASCO offers two complete curriculum solutions: *Essential Physics* and *Essential Chemistry*. Each program includes a Student Textbook, Student e-Book, Lab Manual, and Equipment Kits, all at a very affordable price. Other program features include:

- Animations and videos
- Flexible assessment options
- Interactive simulations
- Investigations and design challenges

STEM Solutions

Hands-On Coding, Sense and Control Kits (See pages 16-29)

STEM Sense Kits engage students in the exploration of coding applications with real-world investigations into sensor technologies. Each complete kit includes hands-on, phenomena-based investigations; award-winning data collection and analysis software with block-based coding capability; our unique //code.Node device with programmable sensors, lights and sounds; and all the accessories you need to do the activities. Take student designs to the next level with the all new //control.Node and Sense and Control Kits.

Storage & Classroom Management

Gratnells Rolling Carts, Storage Trays and Charging Stations (See page 126)

Gratnells storage solutions are the best way to store PASCO sensors and equipment. These movable storage rack carts include large castors with brakes for added stability, and make transporting materials to and from the classroom a breeze.

These carts can be used to store the equipment kits from the *Essential Physics* or *Essential Chemistry* curriculum, the storage trays we offer for wireless sensors, or any of the four sizes of empty trays that we offer for everything else you'd like to store.

PASCO's Hands-On Solutions for K–8 Science

At PASCO, we develop STEM solutions so simple and accessible that even the youngest scientists can use them. Our wireless sensors and engaging activities are the perfect way to introduce K–8 students to inquiry-based discovery learning without overwhelming them. With our NGSS-based solutions, students of all ages can engage in the active learning process as they navigate their way through hands-on exercises that form lasting STEM foundations.

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Elementary Science Starter Lab Station

PS-3314

The Elementary Science Starter Lab Station makes it easy and affordable to begin using sensor-based technology in your elementary science class. Inside the Starter Lab Station are the wireless sensors used to perform seven activities from the Essential Elementary Science Lab Manual. Available separately is the Elementary Science Extension Lab Station (PS-3315) which, when combined with the Elementary Science Starter Lab Station, comprises all the wireless sensors used to perform the ten labs inside the Essential Elementary Science Lab Manual. Once comfortable, you can explore our growing set of over 40 elementary labs in our online experiment library!

Starter Station Lab Titles (1-7)

1. Temperature and Change
2. Evidence of Chemical Reactions
3. Thermal Insulators and Conductors
4. Can Plants Survive Without Light?
5. How a Greenhouse Works: Heat
6. How a Greenhouse Works: Light
7. MatchGraph

Extension Station Lab Titles (8-10)

8. Determining Sound Levels
9. Weather and Climate: Microclimates
10. Weather and Climate: Monitoring Weather

Elementary Science Lab Station with extension sensors

The Elementary Science Starter Lab Station is a complete solution that includes these wireless sensors and materials:

- Temperature
- Light
- Motion
- Storage Case
- Lab Manual

The Elementary Science Extension Lab Station has the additional wireless sensors (Sound PS-3227 and Weather PS-3209) needed to perform all 10 labs inside the Essential Elementary Science Lab Manual.

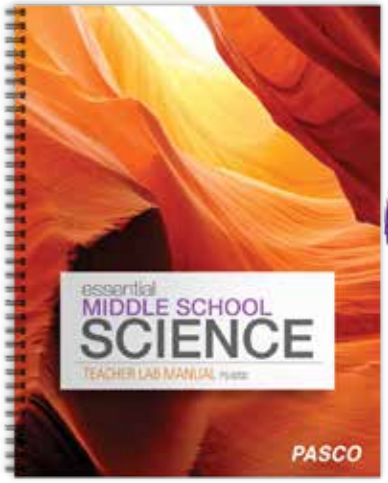
Order Information

Elementary Science Starter Lab Station PS-3314
Elementary Science Extension Lab Station.....PS-3315

Middle School Science Starter Lab Station

PS-3312

The Middle School Science Starter Lab Station makes it easy and affordable to begin using sensor-based technology with your middle school students. Inside the Starter Lab Station are the wireless sensors used to perform six activities from the Essential Middle School Science Lab Manual. Available separately is the Middle School Science Extension Lab Station (PS-3313) which, when combined with the Middle School Science Starter Lab Station, comprises all the wireless sensors used to perform all 10 labs included inside the Essential Middle School Science Lab Manual, as well as many of the Middle School labs in PASCO's online experiment library.



Middle School Science Lab Titles

The Middle School Science Starter Lab Station supports 6 of the 10 labs. Add the Extension Lab Station* to do all 10 lab titles.

1. **Describing Motion**
2. Humidity and Dew Point*
3. **Night and Day**
4. **Seasons and Temperatures**
5. **Thermoregulation**
6. **Introduction to Acids**
7. Photosynthesis*
8. **Acid Rain and Weathering**
9. Forces and Interactions*
10. Waves and Energy*

Middle School Science Lab Station with extension sensors

The Middle/Secondary School Science Starter Lab Station includes these wireless sensors and materials:

- Temp
- Light
- pH
- Motion
- Storage Case
- Lab Manual

The Middle School Science Extension Lab Station has the additional wireless sensors (CO_2 PS-3208 and Weather PS-3209) needed to perform all 10 labs inside the Essential Middle School Science Lab Manual.

Order Information

Middle School Science Starter Lab Station.....PS-3312

Middle School Science Extension Lab Station.....PS-3313

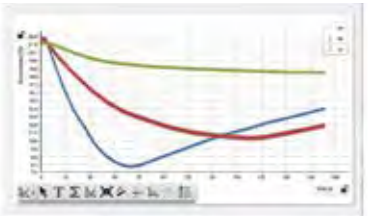
***NEW!* STEM GREENHOUSE KIT**

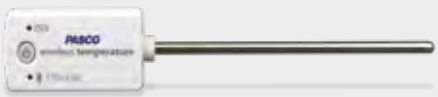
Explore modern greenhouse technologies with sense and control capabilities. This solution includes all of the sensors, data collection, coding tools, and equipment you need to get started. (See pages 28-29)

Wireless Temperature Sensor

PS-3201

Welcome to the modern thermometer. Now, students can access real-time data that continuously monitors, logs, and plots temperature measurements on nearly any device. When lab time ends but the experiment continues, students can set the sensor to log data autonomously for days, then download it for analysis later. This durable, wireless sensor features a stainless steel probe for the most demanding of applications, as well as a battery that lasts up to a year. It can be used in a wide array of experiments and activities because it measures small but significant temperature changes produced by chemical reactions, convection currents, and even skin temperatures.





Order Information

Wireless Temperature Sensor.....PS-3201
Wireless Temperature Sensor Pack PS-3330
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless pH Sensor

PS-3204

The Wireless pH Sensor is a must-have for any science course. Equally capable in the lab or field, the sensor eliminates the hassle of cables, reducing spills and improving safety. Plus, it rarely requires charging; the sensor's coin cell battery lasts for 2-3 years in most labs and costs about one dollar to replace. It can transmit data in real time, or store data for days when continuous monitoring is required. The Wireless pH Sensor enhances countless activities, including acid-base titrations, investigations into household chemicals, analyses of chemical reactions, water quality studies, and much more.

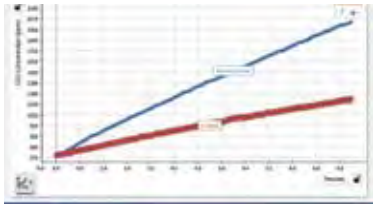
Order Information

Wireless pH Sensor.....PS-3204
Wireless pH Sensor Pack PS-3331
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless CO_2 Sensor

PS-3208

Measure changes in carbon dioxide (CO_2) gas levels quickly and easily with the Wireless CO_2 Sensor. This temperature-compensated sensor can operate in high humidity environments, such as the included 250-mL sample bottle, and employs live data to make core labs, such as photosynthesis, cellular respiration, and metabolism experiments engaging and impactful. With the ability to store more than 55,000 data points, the sensor also supports long-term studies of carbon cycling that span the course of a single night or an entire weekend.



Order Information

Wireless CO_2 Sensor (Carbon Dioxide).....PS-3208
Wireless CO_2 Sensor Pack PS-3341
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Weather Sensor with GPS

PS-3209

The Wireless Weather Sensor is an all-in-one instrument for monitoring complex environmental conditions. It houses several sensing elements within a single unit to provide 19 different measurements. Use the sensor in logging mode with the Weather Vane Accessory for long-term monitoring, or use it as a handheld instrument to study microclimates and local, environmental phenomena.

Weather Vane Accessory sold separately.

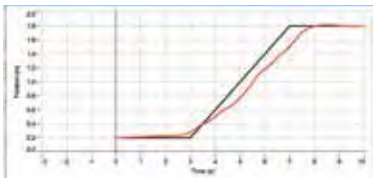
Order Information

Wireless Weather Sensor with GPS PS-3209
Weather Vane Accessory.....PS-3553

Wireless Motion Sensor

PS-3219

The Wireless Motion Sensor connects to your device via Bluetooth® or USB, and uses ultrasound to measure the position, velocity, and acceleration of objects. This enables students to take turns measuring their own distance from the sensor, while the class observes their motion materializing as a graph in real time. The sensor can detect objects ranging from 15 cm to 4.0 m away, and with no cables to get in the way, students can explore handheld and ceiling-mounted applications.



FREE MatchGraph! Software

Download Mac®, Windows® and Android™ versions at pasco.com. iOS version available on Apple App Store.

Order Information

Wireless Motion Sensor PS-3219
Wireless Motion Sensor Pack.....PS-3337

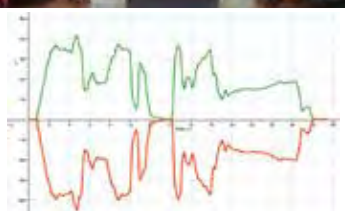
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Force Acceleration Sensor

PS-3202

Capable of simultaneously measuring force, acceleration, and rotational velocity, this sensor is ideal for experiments involving rotating platforms, moving carts, spring oscillations, collisions, or impulse. The wireless design offers improved measurement accuracy by eliminating cords that affect data collection. Students can use the finger-holes for handheld applications, or mount it onto a cart or rod for more complex experiments.

The Wireless Force Acceleration Sensor is perfect for explorations of Newton's 3rd Law.



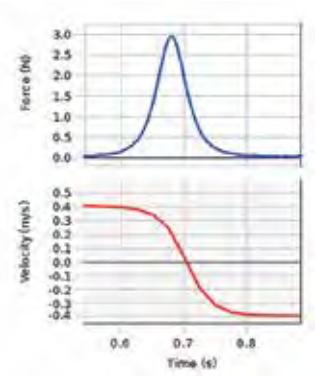
Order Information

Wireless Force Acceleration Sensor.....PS-3202
Wireless Force Acceleration Sensor Pack PS-3339

Smart Cart (Red & Blue)

ME-1240/ME-1241

The patented Smart Cart is the ultimate tool for studying kinematics, dynamics, Newton's Laws, and more. It is based on a durable ABS body with nearly frictionless wheels, just like our high quality PAScars. Now, we've added built-in sensors that measure force, position, velocity, and acceleration. The versatile Smart Cart can collect measurements on or off a track and transmit the data wirelessly over Bluetooth®. In essence, it is a wireless dynamics cart that combines all the necessary sensors, without requiring any additional hardware.



Order Information

Smart Cart (Red).....ME-1240
Smart Cart (Blue) ME-1241

Constant Velocity Car

SE-8028A

Turn on the Constant Speed Buggy and watch it go. When it reaches a wall, it flips over and changes directions. This low-cost solution features flashing lights and a sporty appearance. Requires two "C" batteries that are not included. Actual product may vary from picture.

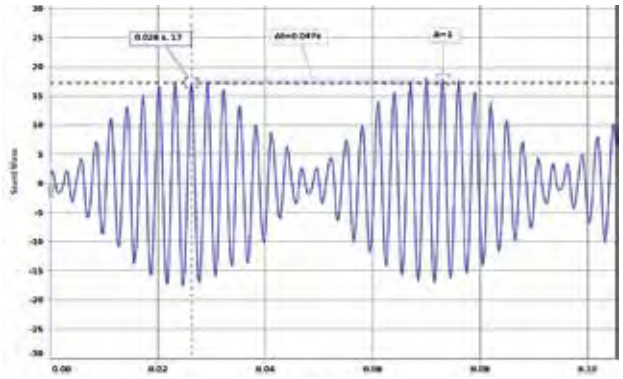
Order Information

Constant Velocity Car (Constant Speed Buggy) SE-8028A

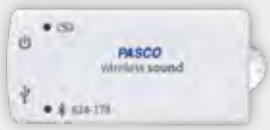
Wireless Sound Sensor

PS-3227

The Wireless Sound Sensor is two sensors in one wireless package: a sound wave sensor capable of measuring changes in frequency as pitch changes, and a sound level sensor to determine and compare loudness.



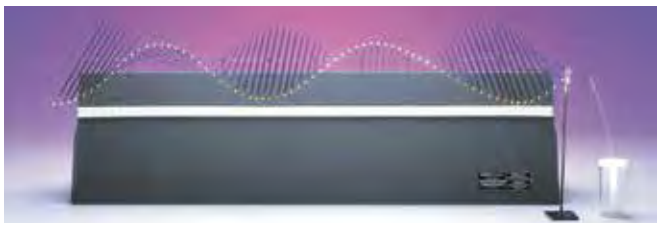
Easily observe and measure beat frequencies



Order Information

Wireless Sound Sensor PS-3227
Wireless Sound Sensor Pack.....PS-3342

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*



Single Section Wave Motion Demonstrator

SE-9601

The Single Section Wave Motion Demonstrator produces mechanical waves to illustrate many of the properties and behaviors associated with different wave types. Students can explore how the velocity, frequency, and wavelength interact, visualize the superposition of waves, and easily study resonance conditions that cause standing waves.

Order Information

Single Section Wave Motion Demonstrator.....SE-9601

Wireless Light and Color Sensor

PS-3248

The Wireless Light and Color Sensor features two separate apertures: One measures ambient light from the side of the box, and the other measures percent color of directional light at the end of the box.

Order Information

Wireless Light and Color Sensor.....PS-3248
Wireless Light Sensor Pack.....PS-3338

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Color Mixer

OS-8496

With three independently controllable LEDs, the Color Mixer offers a simple way to explore light and color with your students. It functions as both a demonstration tool and an expansion piece to the Basic Optics System.

The intensity of the red, green, and blue LEDs can easily be varied, either individually or all together. Demonstrating additive color mixing is as simple as using any flat surface to project the light upon.

Use it as a projector in classroom demonstrations. Individually adjust the intensity of the super bright red, green, and blue LEDs.

Order Information

Color Mixer.....OS-8496

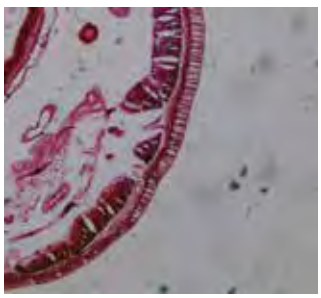
Standard Compound Optical Microscope

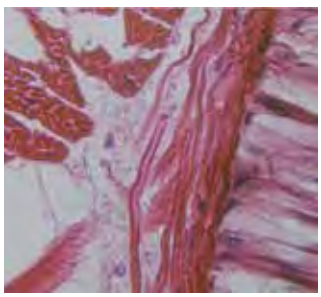
SE-6213

Standard optical microscope great for general viewing of cell structures at 40x, 100x, 400x viewing. Gives insights to topics from Biology, Life Science, Anatomy and Physiology, Cellular and Field Biology. High quality optical lenses allow for fine details in high contrast can be studied in appropriate detail for starter to experienced microscope users. Perfect for establishing labs with sets of durable equipment classes can use for years. Compatible with student or professionally prepared slide set like the Microscope Slide Kingdom survey (SE-6214) gives students a solid start to explore cellular features and concepts across all living kingdoms.

Features:

- Observe small specimens like plant, animal, and bacterial cells, translucent objects such as insect larvae, or fine particles like powder
- 10 x eye piece
- 10x eyepiece and 4x, 10x, and 40x (oil) objective lenses provide magnification options of 40x, 100x, and 400x
- Adjustable focus between coarse and fine settings
- Dual light source (upper and lower LED) provides adjustable brightness
- Cord or cordless power options (External AC/DC Adaptor or 3xAA Batteries)
- Equipped with a plain stage with clip and single lens condenser with disc diaphragm





Sample imagery above captured with standard eyepiece USB camera. Slides from the *Kingdoms Survey,Prepared Slide Set* (sold separately)

Order Information

Standard Compound Optical Microscope.....SE-6213

Prepared Slide Set, Kingdoms Survey SE-6214

EcoZone System

ME-6668

PASCO's EcoZone System is designed to help students model and understand the complex interactions within and among different ecosystems. The three clear acrylic EcoChambers are specially designed to accommodate PASCO sensors, making qualitative and quantitative measurements very easy to observe.

With three interconnected chambers, students can model the interaction between three different ecosystems. Choose the traditional terrestrial, aquatic, and decomposition environments or create unique biomes to model and measure. Decouple the system for isolated investigations. How does the availability of light affect the ecosystem? Students can create two identical ecosystems for precise control of variable impact.

Order Information

EcoZone System ME-6668

Renewable Energy Kit

ST-7611

Using PASCO's renewable energy kit, students will be challenged to create a designs for solar and/or wind power that maximize energy output under explored sets of conditions. Students have full control of blade number, blade angles, electric loads, solar incidence, affect of dust on solar cells in order to find the optimal orientation for power generation. This is a great way to leverage the knowledge they've acquired for an engineering design challenge and bring STEM into your classroom.

Order Information

Renewable Energy Kit.....ST-7611

MindLabs
ENERGY and CIRCUITS

FEATURED IN TechCrunch · 2020 National Parenting Product Awards Winner · Forbes

Combine the fun of tabletop games with the excitement of Augmented Reality!

- Student-centered, inquiry-based learning
- Aligns with STEM standards
- Includes FREE app and circuit cards
- Each set accommodates up to 4 players
- Classroom Set accommodates up to 6 teams of 4 players

Explore energy and circuits through augmented reality with these interactive playing cards and free app. Includes six sets of twenty cards.

Gooseneck tablet stand frees up students' hands for interacting with cards and app.

Ages 8+

The MindLabs Energy and Circuits Kit is a magical STEM learning tool for children ages 8 and older. It combines 20 game cards, a free digital app, and augmented reality to provide students with a fun and immersive learning experience. Play alone or collaborate with friends as you add and remove cards, draw wires, and create circuits that come to life in 3D! Students interact with characters to save the day with STEM. The ideal learning tool for solo or team play, MindLabs enables students to explore energy sources, circuits, and more.

- Create, play, and collaborate from any location!
- Assemble cards picturing batteries, light bulbs, fans, and more into working circuits
- Draw and connect wires on a mobile device to bring circuits to life
- Investigate energy resources with animated idea cards
- Step-by-step lessons guide students through basic circuit concepts
- Apply concepts to solve challenges and repair circuits

Features:

- Work independently or collaborate with students in any location
- Includes 20 cards and more than 20 interactive challenges with step-by-step guidance
- Extra thick cards will withstand years of use in your classroom
- Free application is intuitive and engaging for young learners
- Five full lesson plans with YouTube™ video supplements

MindLabs' app is available FREE for Apple® and Android™ tablets and smartphones.

Download on the App Store · ANDROID APP ON Google play

Minimum iOS Requirements: iPhone SE 2016, iPad Mini Gen 5, or iPad 2017 running iOS 11 or later

Minimum Android Requirements: Google Pixel, Samsung S8, Moto Z2, HTC U11, or comparable devices running Android 9 or later

MindLabs Energy and Circuits kits can be purchased individually or in class sets of 6. Gooseneck Tablet Stands are included with the ***Complete Class Set*** *only (Qty. 6).*

Order Information

MindLabs: Energy & Circuits Single Set	SE-7170
MindLabs: Energy & Circuits Class Set	SE-7171
MindLabs: Energy & Circuits Complete Class Set	SE-7172
Gooseneck Tablet Stand	SE-7173

STEM SENSE SOLUTIONS

STEM Sense solutions help foster early success in science and STEM education with cross-curricular investigations that help learners build strong foundations in science, programming, and data literacy. Each complete kit includes an easy-to-use coding device, award-winning software with Blockly coding, hands-on and phenomena-based investigations, and the equipment and supplies students need to complete each activity.

Coding With Sensor Technologies Kit

Coding With Vehicle Sensor Technologies Kit

Coding With Sound & Light Sensor Technologies Kit

800.772.8700 (inside US) +1 916.786.3800 (outside US)

Student Activities and Teacher Resources

Whether they're new programmers or hobby hackers, STEM Sense Kits make it easy to support students of all learning levels with a variety of scaffolded activities and open-ended challenges. Each lesson is based upon the latest science standards and incorporates cross-curricular connections to reinforce key concepts in computer science, mathematics, and language arts.

SPARKvue + Block-Based Programming

SPARKvue offers all the benefits of a visual coding environment with additional features for data collection, visualization, and analysis. When students execute a program in SPARKvue, they can monitor sensor data collection in real time, displaying it in digits, graphs, and/or text. Students can also combine PASCO sensors and coding devices, such as the //code.Node, to create programs that interact with the physical world. With PASCO and Blockly, students can learn how to create, modify, and execute block-based coding programs while developing the skills they'll need to progress on to traditional text programming languages like Java, Python, and C++.

Coding & Control Devices + Equipment

The //code.Node and //control.Node bridge the gap between science and computer science to provide students with hands-on learning opportunities that promote literacy in science, programming, and data collection. All PASCO coding devices integrate with our sensors and data collection and coding software, enabling students to perform basic coding with technology activities as well as more advanced sense and control investigations. STEM Sense Kits come ready-to-use with all the additional equipment and supplies required to do the activities, including magnets, tuning forks, the //code.Node Cart, the PASCObot, and much more.

PASCObot Sense & Control Kit

Greenhouse Sense & Control Kit

//control.Node Sense & Control Kit

SPARKvue & Blockly Coding: Computational Thinking Meets Data Literacy

The Integration of Blockly into SPARKvue software provides science and STEM teachers with an intuitive coding platform that fits their needs. Rather than introducing students to coding independently, Blockly integrates computational thinking into the exploration of phenomena to provide learners with a new world of STEM opportunity.

With Blockly, students can create custom data collection parameters, feedback loops, data displays, and so much more.

Use Blockly in SPARKvue to:

- Introduce students to computational thinking
- Investigate phenomena while learning to code
- Create data-driven feedback loops
- Program data collection parameters for any PASCO sensor or interface

Create code that collects, displays, and responds to sensor data! Interact with the physical world using the PASCO //code.Node or //control.Node.

Support computational thinking in science with ready-to-use Blockly extension activities.

Free award winning data collection and analysis software now runs in your browser!

We're excited to announce SPARKvue is now available **FREE** of charge on all your devices as a browser-based application. This new version of our software as a Progressive Web Application (PWA) means you have free access to all the features of SPARKvue from Google Chrome and Microsoft Edge browsers.

Go to sparkvue.pasco.com to access the PWA. SPARKvue is also available as a **FREE** app for Chromebook™, iPad®, Android™ tablets, and Apple® and Android™ smartphones.

SPARKvue® Launch now as a Web App PWA + Download on the App Store Available in the Chrome Web Store ANDROID APP ON Google play

Looking for additional options? See pasco.com/sparkvue for more details.

PASCO's award-winning data collection and analysis software includes Blockly coding with data displays!

Getting started with //code.Node is quick and easy. Simply connect the //code.Node to SPARKvue and begin coding instructions for its sensor inputs and device outputs. As the code is executed, SPARKvue displays real-time data from the //code.Node's active sensors, which triggers a response from the //code.Node's lights and sounds. Other PASCO sensors may also be used in Blockly programs, enabling students to explore a new world of opportunity.

Explore more advanced coding applications with the //control.Node.

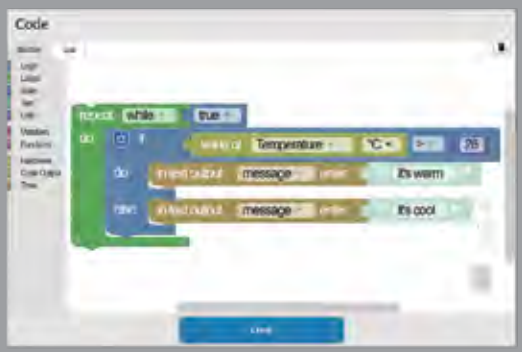
Use Blockly with any PASCO Wireless Sensor!

INPUT

Select one or more //code.Node sensor inputs and a device output.

Pair //code.Node to your device, or use it in standalone mode.

CODING IN SPARKVUE

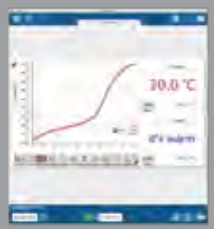


Drag and drop coding blocks to create a functioning program. Then execute it!

OUTPUT

Sensor data triggers a response in the device's sound & light outputs.

OUTPUT



SPARKvue displays data collected by the sensor input in real time.

HELLO

Meet //code.Node!

The //code.Node is a hands-on coding device with interactive sensors, lights, and sounds that make learning to code a real-life STEM adventure. Designed for ages eight to fourteen, the //code.Node helps kids harness their natural curiosity to create block-based programs that bring their ideas to life.

Whether they're interested in cars, robots, sports, or science, //code.Node allows students to explore the things they love through coding. Together, the //code.Node, interactive activities, and step-by-step video lessons enable new coders to master the basics at their own pace while the accessories and wrist-strap ensure confident coders never run out of possibilities.

INPUTS

- Magnetic Field Sensor
- Motion Sensor
- Temperature Sensor
- Sound Sensor
- Light Sensor
- Momentary Switches

OUTPUTS

- RGB LED
- Speaker
- 5x5 LED Array
- Text

Order Information

//code.Node.	PS-3231
//code.Node Holder	PS-3233
//code.Node (Set of 8)	PS-3311

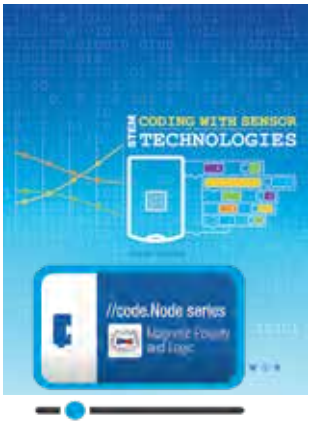
Coding with Sensor Technologies Kit

ST-7800

The Coding with Sensor Technologies Kit introduces students to coding and includes ten hands-on investigations that explore science phenomena using the //code.Node's programmable sensors, lights, and sounds.

Student Activities and Video Lessons

The Coding with Sensor Technologies Kit includes ten investigations with video lessons, printed student worksheets, and an interactive digital flipbook that presents the resources in an engaging, student-friendly format. Each lesson is based upon the latest science standards and incorporates cross-curricular connections to reinforce key concepts in computer science, mathematics, and language arts.



Activities and Video Lessons

- Magnetic Polarity
- Random Number Cube
- Automatic Nightlight
- Light Bulb Efficiency
- Clap On
- What's the Origin?
- Investigating Sound Levels
- Step Counter
- Intruder Alarm
- Digital Thermometer

Build career awareness with activities that make real-world connections to:

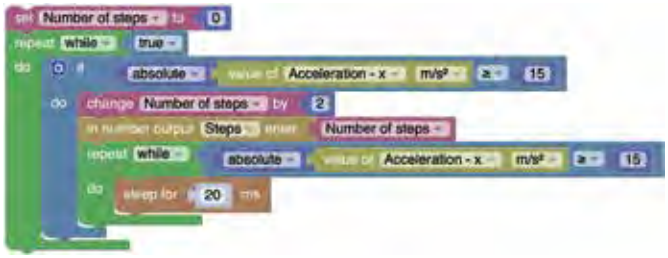
- Engineering with real-life sensors
- Designing "smart" home technology
- Programming and developing sensor-based safety features

Help students develop competency in:

- Problem-solving, logical reasoning, and critical thinking
- Computational thinking
- Data collection and analysis
- Mathematics
- Technology and programming

Block-Based Coding

Blockly simplifies the programming process for new coders. Visual coding blocks connect like puzzle pieces to help students master the basics of programming without having to worry about their syntax.



Coding with Sensor Technologies Equipment

The Coding with Sensor Technologies Kit includes a //code.Node, two painted bar magnets, and a //code.Node Holder with wrist-strap. Wireless and easy-to-use, the //code.Node includes six sensor inputs, a speaker, RGB light, and an LED Array, all of which enable students to explore exciting phenomena using block-based programs that collect, display, and respond to data.

Includes:

- //code.Node PS-3231
- //code.Node Holder PS-3233
- Painted Bar Magnet (Pair) SE-7593
- Color-Printed Booklet of Student Activities

Order Information

Coding with Sensor Technologies Kit.....ST-7800

Coding with Sensor Technologies Kit (without //code.Node) ST-7801

Coding with Vehicle Sensor Technologies Kit

ST-7820

Explore the science and sensors behind today's modern vehicles while teaching students about physical science as they design, test, measure and code with sensors that mimic real-world vehicle technology.

Student Activities and Video Lessons

This complete kit includes five investigations with video lessons, printed student worksheets, and an interactive, browser-based flipbook that presents the resources in an engaging, student-friendly format. Each lesson is based upon the latest science standards and incorporates cross-curricular connections to reinforce key concepts in computer science, mathematics, and language arts.

Activities and Video Lessons

- Crash Test - Impact Alert System
- Investigating Odometers
- Engineering Turn Signals
- 3-2-1 Launch!
- The Need for Speed - Radar Detectors

Build career awareness with activities that make real-world connections to:

- Automotive engineering
- Real-life vehicle sensors
- Crash test engineering

Help students develop competency in:

- Problem-solving, logic, and critical thinking
- Computational thinking
- Data collection and analysis
- Mathematics
- Technology and programming

Block-Based Coding

Blockly simplifies the programming process for new coders. Visual coding blocks connect like puzzle pieces to help students master the basics of programming without having to worry about their syntax.

Coding with Vehicle Sensor Technologies Equipment

The Coding with Vehicle Sensor Technologies Kit comes classroom-ready with all the equipment, accessories, and software needed to complete the included activities. The complete kit includes a //code.Node, a //code.Node Cart, a color-printed booklet of student activities, two light spring bumpers, six 50-g masses; a 1.5-m roll of measuring tape, a spool of thread, and two block person figurines.

Includes:

- //code.Node PS-3231
- //code.Node Cart PS-3235
- Color-Printed Booklet of Student Activities
- Light Spring Bumpers (Qty. 2)
- 50 g Masses (Qty. 6)
- Soft Measuring Tape, 1.5 m
- Spool of Thread
- Block Person Figurines (Qty. 2)

Order Information

Coding with Vehicle Sensor Technologies Kit ST-7820

Coding with Vehicle Sensor Technologies Kit (without //code.Node) ST-7821

Coding with Sound and Light Sensor Technologies Kit

ST-7830

The Coding with Sound and Light Sensor Technologies Kit engages students in the exploration of light and sound with five hands-on coding investigations that use familiar phenomena and real-world sensors to bring concepts to life.

Student Activities and Video Lessons

This complete kit includes five investigations with video lessons, printed student worksheets, and an interactive, browser-based flipbook that presents the resources in an engaging, student-friendly format. Each lesson is based upon the latest science standards and incorporates cross-curricular connections to reinforce key concepts in computer science, mathematics, and language arts.

Activities and Video Lessons

- What is a Color Sensor?
- RGB LED - How to Program Color
- Engineering Sound Level Meters
- Detect an Intruder - Home Alarm Systems
- Investigating Electronic Tuners

Build career awareness with activities that make real-world connections to:

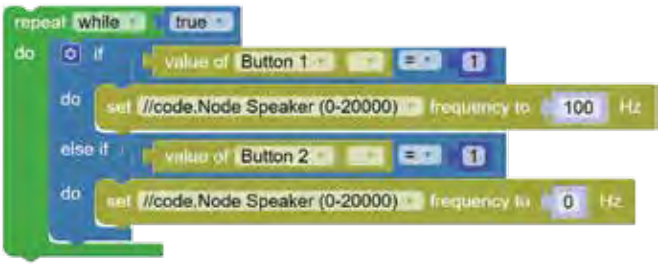
- Audio engineering and light technicians
- Programming and developing sensor-based security features
- Real-world innovations in sound and light technology

Help students develop competency in:

- Problem-solving, logic, and critical thinking
- Computational thinking
- Data collection and analysis
- Mathematics
- Technology and programming

Block-Based Coding

Blockly simplifies the programming process for new coders. Visual coding blocks connect like puzzle pieces to help students master the basics of programming without having to worry about their syntax.



Coding with Sound and Light Sensor Technologies Equipment

The Coding with Sound and Light Sensor Technologies Kit includes everything students need to explore concepts in light and sound through STEM. The complete kit includes: a //code.Node; a //code.Node Holder with wrist-strap; two tuning forks of different frequencies; a small flashlight; a color-printed booklet of student activities; a set of colored paper; and five sheets of aluminum foil.

Includes:

- //code.Node PS-3231
- //code.Node Holder PS-3233
- Color-Printed Booklet of Student Activities
- Small Flashlight
- Tuning Fork, Various Frequency (Qty. 2)
- Colored Paper, Various 4"x 4" Sheets (Qty. 35)
- Aluminum Foil Sheet, 4"x 4" Sheets (Qty. 5)

Order Information

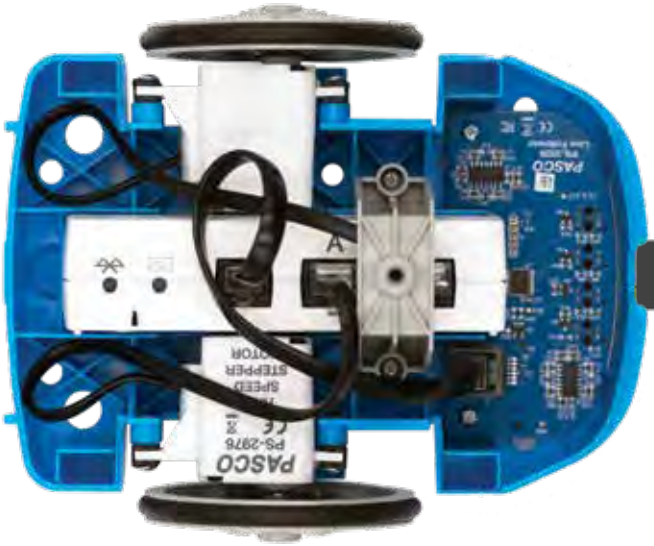
Coding with Sound and Light Sensor Technologies Kit ST-7830

Coding with Sound and Light Sensor Technologies Kit (without //code.Node) ST-7831

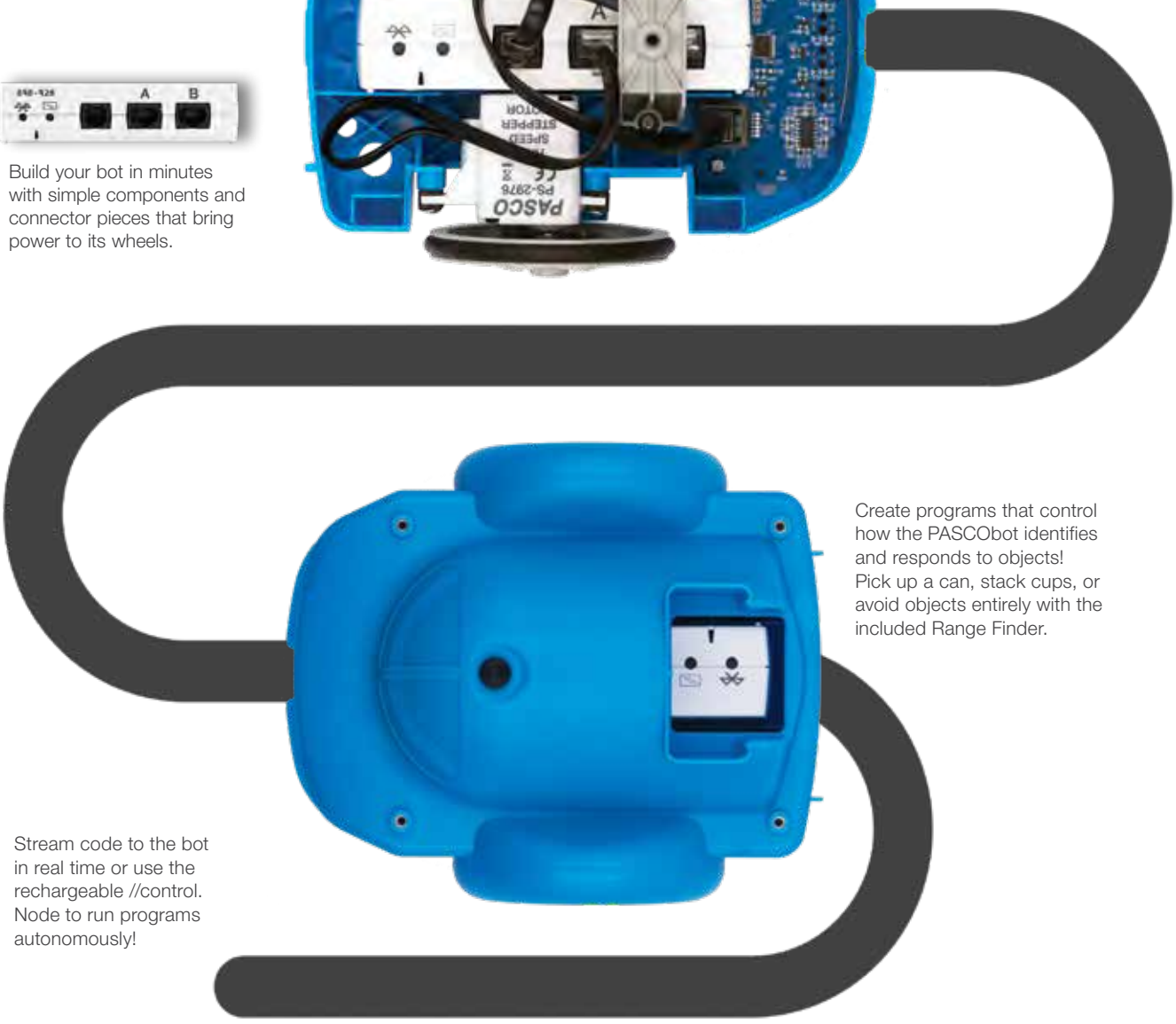
*PASCO*bot
SENSE & CONTROL KIT

When nestled inside the PASCObot, the //control.Node serves as a brain, providing both power to the bot and memory storage for students' code.

Build your bot in minutes with simple components and connector pieces that bring power to its wheels.



Navigate custom paths, obstacles, and more with code blocks that drive the bot forwards, backwards, or around corners and curves.

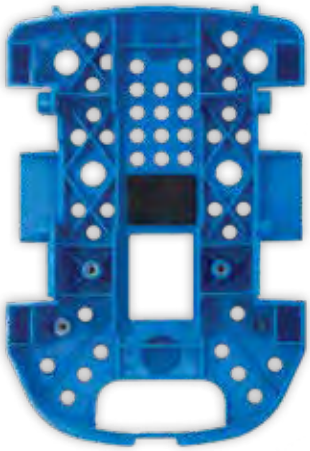


Create programs that control how the PASCObot identifies and responds to objects! Pick up a can, stack cups, or avoid objects entirely with the included Range Finder.

Stream code to the bot in real time or use the rechargeable //control. Node to run programs autonomously!

Designed for ages 11+, the PASCObot Sense & Control Kit includes everything students need to explore STEM through coding and robotics. Whether they're new programmers or hobby hackers, the PASCObot makes it easy to support students of all levels with a variety of scaffolded and open-ended activities.

This complete kit includes a PASCObot and //control. Node, as well as all the accessories needed to program how the bot interacts with its environment. From simple movements and spins to object avoidance to complex obstacle courses, there's no limit to what students can create with PASCObot.



The PASCObot's motion is controlled by two Stepper Motors, which connect to the bot's wheels. Compatible with other STEM Sense products, the Stepper Motors can be controlled individually to move the bot forwards, backwards, and around corners and curves.

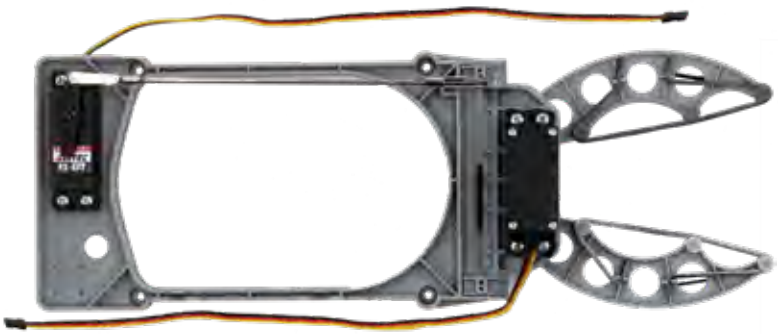
The Line Follower Module lets the PASCObot detect and respond to custom line paths that students create using the included tape.

The Range Finder Module gives the PASCObot sight, allowing it to locate, avoid, and respond to objects based on code.

Wireless and rechargeable, the //control. Node has two ports for stepper motors, two ports for servo motors, and one port for digital sensors.

Design custom obstacle courses using the included cups and tape. Then create code to navigate the bot through the course!

The PASCObot Gripper Accessory opens a new world of opportunity by enabling students to program the bot to move, pick up, or even stack a variety of objects. When used with the included Range Finder, the PASCObot Gripper Accessory allows students to control how the bot identifies and interacts with objects.



Order Information

PASCObot PS-2994

PASCObot Sense & Control Kit ST-7840

The PASCObot Sense & Control Kit (shown above) comes with the PASCObot (body, wheels, stepper motors and //control.Node) and all of the modules and accessories shown above. See below and right for individual ordering.

PASCObot Line Follower Module PS-3320

Order Information

PASCObot Range Finder Module.....PS-3321

PASCObot Gripper Accessory PS-3325

PASCObot Servo Motor SE-2975

Black and White Tape (rolls) SE-2953

Colored Plastic Cup Set (5).....SE-2952

Greenhouse Sense & Control Kit

ST-2997

Designed for the exploration of biological and ecological concepts, the Greenhouse Sense & Control Kit includes everything students need to design, build, program, and study their very own greenhouse.

Student Activities

The Greenhouse Sense & Control Kit includes five student activities that can be edited to fit your course needs. Each activity focuses on a key concept in biology or environmental science and includes extensions to engineering and design practices.

Student Activities

- Program a Sunny Day for Plants
- Code a Cooling Breeze
- Program Perfectly Timed Rain
- Optimize Water Movement
- Program a Greenhouse Sense and Control System

Build career awareness with activities that make real-world connections to:

- Agricultural monitoring
- Ecological management
- Plant physiology

Help students develop competency in:

- Coding
- Problem solving
- Data collection and analysis
- Ecological concepts
- Science and Engineering practices

Block-Based Coding

The Blockly integration within SPARKvue software makes it easy for students to master the basics of programming, without having to worry about their syntax. Rather than overwhelming students with options, Blockly focuses on building coding literacy through a library of customizable, drag-and-drop coding blocks.

As they combine coding blocks, students are provided with visual feedback that lets them know whether two coding blocks are compatible. After mastering the basics, students can go on to create their own programs, complete with custom conditions, commands, data displays, and more. With Blockly and STEM Sense, students can pursue all types of investigations—from single-day experiments to semester-long studies.

Greenhouse Sense & Control Kit Equipment

This complete kit includes an EcoChamber and //control.Node, Soil Moisture Probe, Power Output Module, USB Fan, and Water Pump, PASCO Grow Light, tubing with drip-watering ends, and a Greenhouse Sensor that measures light, temperature, humidity, and soil moisture.

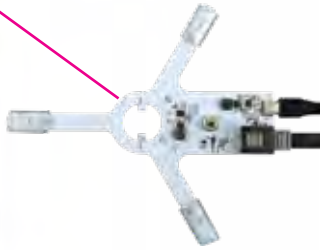
Order Information

Greenhouse Sense and Control Kit.....ST-2997

Create your own ecosystem, optimize growth, and more!

Support authentic science practices while conserving time with automated sensor measurements that make daily observations quick and easy.

Program the PASCO Grow Light to automate light cycles, alter the LED color, or compare the effects of different lighting conditions.



Investigate the effects of temperature, humidity, and wind disturbance.

Design a water source, complete with pump, and control it using code!

Use data from the Soil Moisture Probe to optimize watering schedules for specific species and microhabitats.

Plug your own devices into the included Power Output Module to extend your investigations.

Make data-based decisions with measurements for humidity, temperature, light, and soil moisture.

The //control.Node serves as the Greenhouse's brain, providing power to the light, fan, water pump, and sensors!

Ideal for studies in biology, environmental science, and STEM, the Greenhouse Sense & Control Kit comes fully customizable, enabling students to explore countless interactions between plants and environmental factors.

Potential topics of study include soil moisture, humidity, temperature fluctuations, light availability, inter- and intraspecies competition, wind disturbance, and so much more.

//control.Node

SENSE & CONTROL KIT

The //control.Node Sense & Control Kit helps students discover the engineering and design process through a series of exploratory STEM challenges. It includes a wide variety of programmable components—ranging from smart coding devices and accessories to servo motors and supplies. A collection of six scaffolded, starter projects is also included to help students practice applying elements of the engineering and design process to various real-world scenarios.

//control.Node Sense & Control Kit

PS-5050

The //control.Node Sense and Control Kit empowers students to create and explore through code. This kit includes a //control.Node and accessories that students can use to turn on lights, run a cooling fan, open doors, launch rubber bands, and much more. The kit also includes materials and instructions for six projects:

- Night Light
- Game with Meter
- Automatic Door Opener
- Thermostat-Controlled Fan
- Light-Activated Winch
- Remote Control Rubber Band Launcher

These projects use elements of the engineering design process:

- Define the problem
- Research solutions
- Design a prototype
- Test solution
- Iterative design and improvement

GET STARTED

Learn about the components of PASCO's //control.Node Sense & Control Kit (PS-5050) and how to program them with Blockly code, included with SPARKvue software.

800.772.8700 (inside US) +1 916.786.3800 (outside US)

//control.Node Sense & Control Kit

Motor Bracket and Stand

Servo Motor
SE-2975

//code.Node
PS-3231

USB Fan
PS-6206

Power Output Module
PS-3324

Lightbulb & Stand
with Cable

Pulley

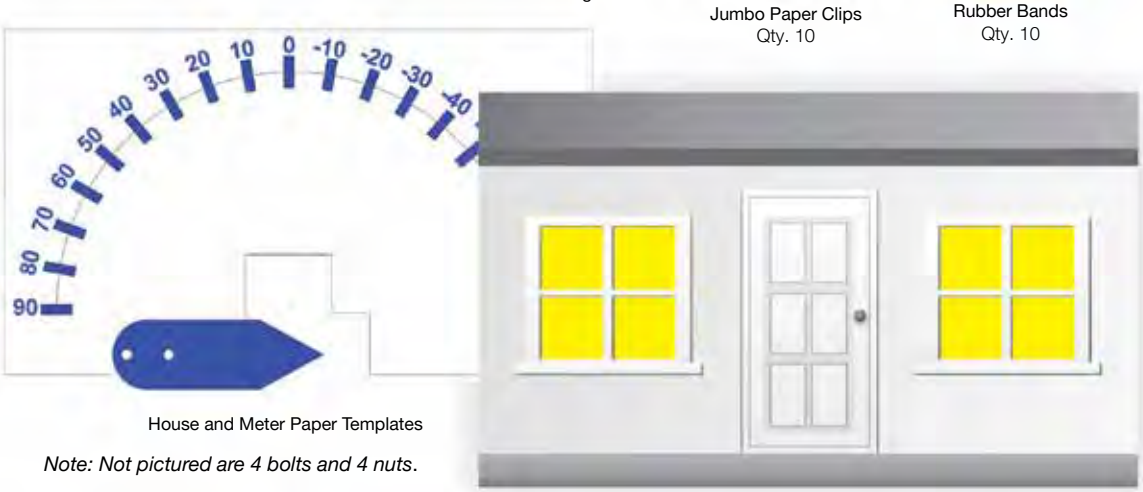
Stepper Motor
PS-2976

//control.Node PS-3232
(ships in separate box)

Small Magnet

Jumbo Paper Clips
Qty. 10

Rubber Bands
Qty. 10



House and Meter Paper Templates

Note: Not pictured are 4 bolts and 4 nuts.

Includes:

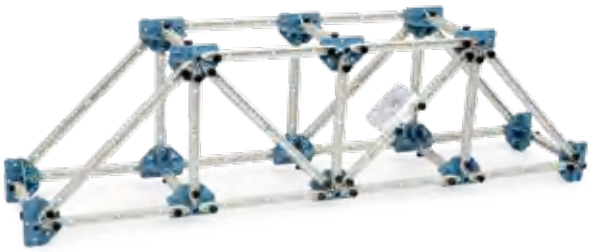
- //control.Node
- //code.Node
- Servo Motor
- High Speed Stepper Motor
- Fan (USB)
- Lightbulb and Stand
- Motor Bracket and Stand
- Power Output Module
- Physics String (not pictured)
- Small Magnet
- Pulley
- Electrical Wires (2)
- Rubber Bands (10)
- Paper Clips for Servo Pushrods (10)
- Mounting Bolts and Nuts for Motors
- House and Meter Paper Templates
- Phillips Screwdriver (not pictured)

Order Information

//control.Node Sense and Control Kit..... PS-5050

Sense and Control Kit (without //control.Node) PS-5051

This kit is intended for courses that already have a //control.Node. The kit is identical to PS-5050 except it does not include a //control.Node (PS-3232).



Building Better Bridges Kit

ME-3581

Now is the perfect time for your students to learn about bridge-building and how bridges really work. This complete STEM kit allows students to learn and apply engineering design concepts. They can use the included I-Beams to build bridges and structures that behave like the real thing! And, with the included Wireless Load Cell, students can measure forces under tension or compression anywhere in their structures.

Concepts:

- Forces in Equilibrium
- Internal Forces
- Moments in Equilibrium
- Strength of Members
- Truss Analysis

Includes:

- Lab Activities (Qty. 1)
- Wireless Load Cell and Accelerometer (Qty. 1)
- Truss Connector (Qty. 16)
- Truss Screw (Qty. 80)
- Sliding Connector (Qty. 1)
- Mass Hanger (Qty. 1)
- Weight Set (Qty. 1)
- #1 Flexible I-Beam Member (Qty. 6)
- #2 Flexible I-Beam Member (Qty. 2)
- #3 Flexible I-Beam Member (Qty. 10)
- #4 Flexible I-Beam Member (Qty. 18)
- #5 Flexible I-Beam Member (Qty. 8)
- Gratnells® Storage Tray and Foam Liner (Qty. 1)

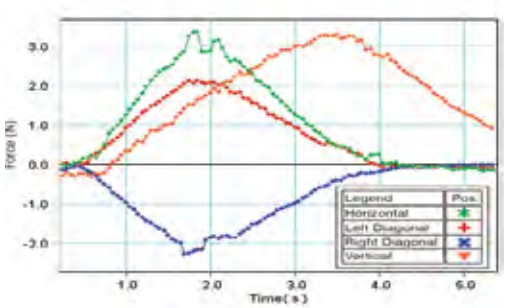
Building Better Bridges includes everything students need to build, measure, and test a truss bridge—plus a Gratnells® Storage Tray to keep it all organized.

Order Information

Building Better Bridges Kit ME-3581

With the PASCO Structures System, students can quickly build, test, and redesign their structures while learning about the engineering process. Construction is easy: Simply fit an I-beam into a Connector, and secure it with thumbscrews.

Wireless Load Cells can be placed anywhere in your structure to make real-time measurements of tension and compression.



PASCO software lets students create live graphs of forces over time, compare measurements from different points, and analyze their results.

Motorized Crane

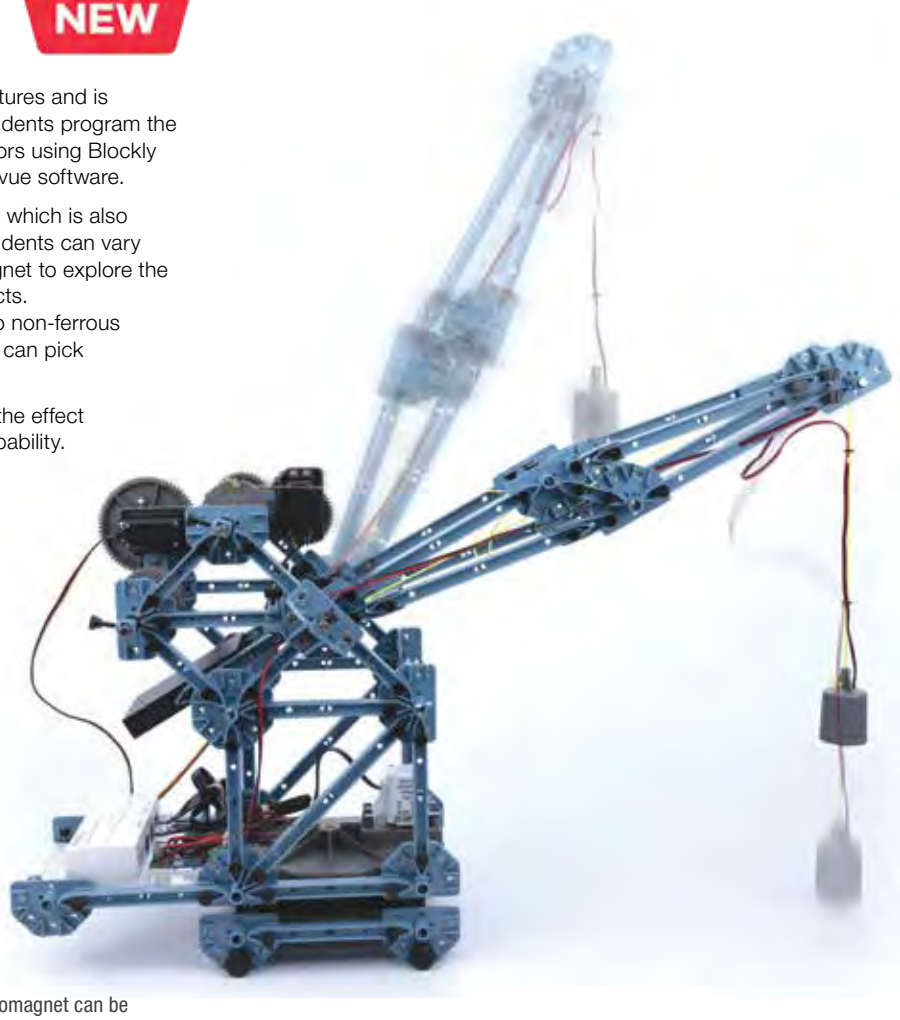
NEW

ME-7030

The Motorized Crane is made using PASCO Structures and is controlled and powered by the //control.Node. Students program the controller to run the stepper motor and servo motors using Blockly coding embedded in PASCO Capstone or SPARKvue software.

The crane picks up objects with an electromagnet which is also controlled and powered by the //control.Node. Students can vary the duty cycle to vary the power of the electromagnet to explore the minimum power required to pick up different objects. Steel washers are included with stickers to stick to non-ferrous objects such as paper cups so the electromagnet can pick up a variety of objects.

The crane includes three sets of gears to explore the effect of gear ratios (1:1, 2:1, 4:1) on speed and lifting capability.



Activities:

- Build the Motorized Crane
- Introduction to Stepper and Servo Motors
- Position Boom Angle and Electromagnet height to reach a position
- Pick up a ball and drop it into a cup on a different level
- Effect of Gear Ratios on Speed
- Effect of Duty Cycle on the Load the Electromagnet Can Lift
- Effect of Spool Diameter

Features:

- The controller can execute its code via Bluetooth® or USB connection to a computer or autonomously via uploaded code.
- The motors and electromagnet on the crane are powered by the rechargeable battery in the //control.Node.
- The position and speed of the stepper motor and electromagnet can be displayed in the software while the code is executed.
- The cable spool has two diameters to learn about mechanical advantage.
- The //code.Node accelerometer is used as a joystick to move the crane so the crane can learn the locations of certain positions.
- Students build the crane and can change the design using additional Structures parts.
- Any PASCO sensor can be used with the crane to expand its capabilities.

Includes:

- //control.Node (PS-3232)
- //code.Node (PS-3231)
- Low Speed Stepper Motor (PS-2978)
- Power Output Module (PS-3324)
- Servo Motor (2) (SE-2975)
- Gear Set (ME-7021)
- Turntable (ME-7024)
- Electromagnet (ME-7027)
- Structures I-Beams (45)
- Structures Connectors (26)
- Structures Counterweight (ME-7037)
- Truss Set Screws (2 sets of 75) (ME-6994)
- Axles (4)
- Small Pulley (2)
- Motor Mount (set of 2) (ME-7020)
- Spool and Bearings (2) (ME-7022)
- //control.Node Platform (ME-7042)
- 0.625-inch Steel Ball (2)
- Storage Box

Order Information

Motorized Crane ME-7030

Motorized Drawbridge

NEW

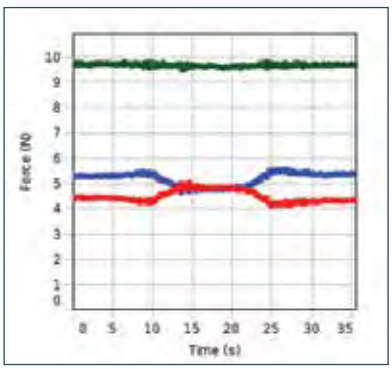
ME-7028

Build this drawbridge from PASCO Structures, add a stepper motor and gears, and raise and lower it using code you write. This bridge kit also includes a Wireless Load Cell/Accelerometer that can be used to measure forces within the bridge while it moves.

Activities:

- Build the drawbridge.
- Raise and lower the drawbridge.
- Measure forces in top and bottom beams.
- Measure support forces.
- Explore the effect of the counterweight on motor acceleration.
- Explore the effects of different gear ratios.
- Use the load cell as a limit switch.
- Operate the drawbridge in response to a signal.

Students write Blockly code to control the drawbridge motion.



The load on the front bridge support (blue), the load on the back bridge support (red), and the total of the two loads (green) are plotted in real time as the bridge is raised and lowered.

Includes:

- //control.Node (PS-3232)
- Wireless Load Cell and Accelerometer (PS-3216)
- Low Speed Stepper Motor (PS-2978)
- Gear Set (ME-7021)
- Structures Counterweight (ME-7037)
- Structures I-Beams (40)
- Structures Connectors (18)
- Structures 6-32 Screws (100)
- Structures Long Axle (1)
- Motor Mount (1)
- Storage Box

Order Information

Motorized Drawbridge ME-7028

StructureBOT Kit

NEW

ME-7029

The StructureBOT is built by students using PASCO Structures. The stepper motors and servo motors that make it move are controlled using a //control.Node connected to a computer through Bluetooth®. Students program the bot using Blockly coding embedded in PASCO Capstone or SPARKvue software.

Activities:

- Build the StructureBOT.
- Move the Bot forward and backward.
- Turn the Bot.
- Power steer the front wheel.
- Move objects with the Gripper.
- Build a two-wheel Bot.

Further Exploration:

- Add a Wireless Motion Sensor to avoid obstacles.
- Add two Light Sensors to follow a line.
- Add a //code.Node to steer the Bot.
- Add a //code.Node for turn signals.
- Add a Wireless Light Sensor to sort colored objects.

Features:

- Multiple configurations: With and without the gripper, two wheels or three wheels, front-wheel steering or dual back-wheel steering
- Expandability: Add other PASCO Structures components to change the StructureBOT's design
- Expandability: Add other PASCO sensors to expand the bot's capabilities

Includes:

- //control.Node (PS-3232)
- High Speed Stepper Motor (2) (PS-2976)
- Servo Motor (2) (SE-2975)
- Structures Gripper (ME-7025)
- Gear Set (ME-7021)
- Caster Wheel (ME-7023)
- Structures Hinge (ME-7026)
- Truss Set Screws (set of 75)
- Structures I-Beams (14)
- Structures Connectors (7)
- Structures Full-Round Connector (2)
- Structures Wheels with Tires (2)
- Structures Medium Axle
- Motor Mount (3)
- //control.Node Platform

Order Information

StructureBOT.....ME-7029

Motor Mount (Set of 2)

NEW

ME-7020

Mount motors to PASCO Structures using the Motor Mount. The Motor Mount fits either a PASCO Stepper Motor or regular size servo motor.

The included spline shaft adapter fits onto the spline of the motor to create a shaft that fits through a hole in the Motor Mount. The motor attaches to the motor mount with four screws. The Motor Mount has the same connection features (pin and screw hole) that the Structures I-beams have so it can be attached to any Structures connector.

The Motor Mount is also used to mount the gripper arms on the Structures Gripper.

Order Information

Motor Mount (Set of 2).....ME-7020

Spool and Bearings

NEW

ME-7022

This two-step spool is used to make a powered winch with PASCO Structures. The spool is secured onto a Structures axle with the included anti-backlash screw. The axle passes through the two included plastic bearings that are screwed to the Structures connectors. These bearings ensure smooth rotation of the axle.

String can be wrapped around either step of the spool to explore the difference in speed and torque made by the spool's diameter.

Order Information

Spool and Bearings.....ME-7022

Gear Set

NEW

ME-7021

These three pairs of gears are driven by stepper motors or servo motors to make PASCO Structures move. These three pairs enable three different gear ratios (1:1, 2:1, 4:1) with the same shaft separation, making it easy to change gear ratios.

The gears are secured on the motor shaft or PASCO Structures axles using the included anti-backlash screws.

The 60T and 72T gears have the hole and threaded hole features that allow a Structures I-beam to be attached directly to the gear.

Order Information

Gear Set ME-7021

Caster Wheel

NEW

ME-7023

The Caster Wheel is part of the Motorized StructureBot but can also be purchased separately to add to your own PASCO Structures designs.

Turntable

NEW

ME-7024

The Turntable is designed to rotate cranes made from PASCO Structures. Add a stepper motor to drive the gear mechanism. Connect any structure built with a square composed of #3 I-beams and connectors.

Order Information

Caster Wheel ME-7023

Turntable ME-7024

Structures Gripper

NEW

ME-7025

Add the Gripper to PASCO Structures to grab objects. Attach a stepper motor or servo motor to the Gripper to drive the gear that opens and closes the Gripper arms. The Gripper has the same pin and screw features used to connect a Structures I-beam to a connector, making it easy to attach the Gripper to any existing PASCO Structure.

Features:

- Gripper mounts to PASCO Structures using the same pin and screw features that are used to connect an I-beam
- Elastic bands add gripping friction
- The //control.Node can detect the increase in servo current so you can tell when the Gripper has closed on an object.

Order Information

Structures Gripper ME-7025

Structures Hinge

NEW

ME-7026

Use the Hinge with the Structures to make movable joints. The Hinge is designed to be used with the PASCO Structures axles and the Hinge can be locked into place on the axle with two screws. The Hinge has attachment features for up to three Structures I-beams.

Structures Counterweight

NEW

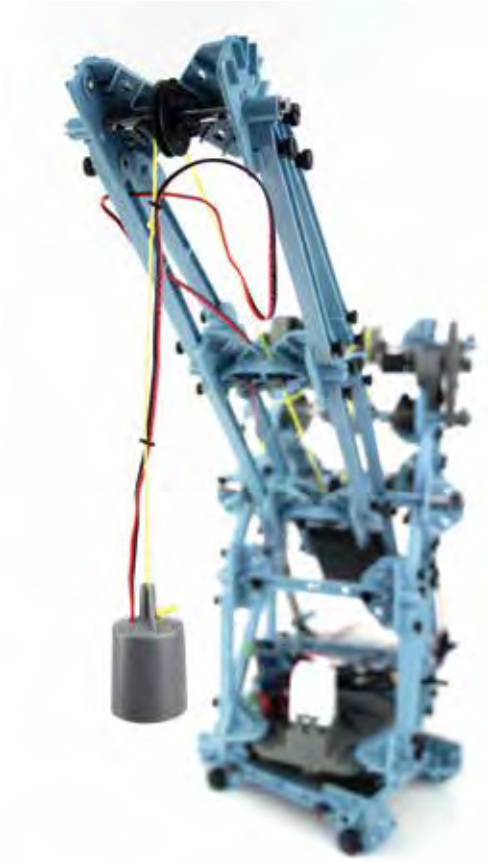
ME-7037

The Counterweight is used to offset the weight of drawbridges and cranes, making them more balanced and requiring less torque to move. Each side has a 6-32 threaded hole and two non-threaded holes that match the same form factor as the Structures I-beam connectors. This allows the Counterweight to be held onto the Structures using I-beams and 6-32 screws.

Order Information

Structures Hinge.....ME-7026

Structures Counterweight ME-7037



Electromagnet

NEW

ME-7027

This Electromagnet can be attached to a winch on a Structures crane to pick up objects. The Electromagnet is powered using a Power Output Module plugged into a //control.Node.

The Electromagnet includes steel washers and stickers to attach to an object so the Electromagnet will be able to pick up a non-ferrous object such as a paper cup.

Vary the power to the Electromagnet by varying the duty cycle of the applied 5 volts.

Order Information

Electromagnet ME-7027

Biology

Educational solutions for General, AP®, IB®, and Honors Biology courses

Hands-On Solutions for Your Biology Lab

Engage your biology students in the thrill of discovery with world-class solutions from PASCO. Our reliable sensors, labs, and software empower students to think like real-life biologists as they form hypotheses, investigate phenomena, and analyze data to make sense of the world around them. With flexible solutions for General, AP®, IB®, and Honors Biology courses, you're sure to find a PASCO solution that's right for you.

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World Class Support and Professional Development - Committed to Your Success!

We want you to have all the support, guidance, and training you need. Just let us know how we can help.

Biology Starter Lab Station

EB-6334

The Biology Starter Lab Station makes it easy and affordable to begin using sensor-based technology in your biology lab or classroom. Designed for convenience, the Biology Lab Stations contain the wireless sensors used to perform 10 Biology labs, plus many of the labs in our Essential Biology Lab Manual. The ten explorations range from the cellular to organismal level and investigate processes such as respiration, photosynthesis, enzymatic activity, membrane permeability and osmosis. Students can also investigate cell size, body regulation, and the impacts of environmental factors on reaction rates and organism responses.

Biology Station Lab Titles

The Biology Starter Lab Station supports 7 of the 10 labs. Add the Extension Lab Station* to do all 10 lab titles.

1. **Enzyme Action**
2. **Membrane Permeability**
3. **Osmosis**
4. Plant Respiration & Photosynthesis*
5. **Respiration of Germinating Seeds**
6. **Acid Rain**
7. **Regulation of Body Heat**
8. Plant Pigments*
9. Cell Size*
10. **Cellular Respiration in Yeast**

The Biology Starter Lab Station

The Biology Starter Lab Station includes these wireless sensors and materials:

- Temperature
- Pressure
- pH
- CO_2
- Storage Case
- Lab Manual

**To do the remaining 3 labs listed above and another 4 labs from the Essential Biology Lab Manual, add the Extension Lab Station (see page 35) and the Essential Biology Through Inquiry Lab Manual.*

Order Information

Biology Starter Lab Station.....EB-6334

Essential Biology Teacher Lab Manual.....EB-6331

Essential Biology Teacher Lab Manual

EB-6331

This printed lab manual includes 23 lab activities that can be edited to suit the needs of your students or to better coordinate with your classroom lectures. Each complete investigation includes a teacher guide and student handout. Student handouts include procedural instructions, blank graphs and tables for data entry, as well as analysis questions with space for students to record their answers. Each investigation is tightly integrated with our innovative software, sensors, and equipment.

- Enzyme Action (Pressure Sensor)
- Enzyme Action (Oxygen Sensor)
- Membrane Permeability
- Organisms and pH
- Osmosis
- Plant Respiration and Photosynthesis
- Respiration of Germinating Seeds
- Buffers in Biological Systems
- Acid Rain
- Cellular Respiration in Yeast
- Energy Content of Food
- Metabolism of Yeast
- Photosynthesis of Aquatic Plants
- Soil pH
- Transpiration
- Water and pH
- Water Purification
- Weather in a Terrarium
- EKG: Factors that Affect the Heart
- Exercise and Heart Rate
- Exercise and Blood Pressure
- Muscle Strength
- Regulation of Body Heat
- Volume of Breath

Advanced Biology Through Inquiry Labs for AP® & IB®

PASCO's award-winning Advanced Biology through Inquiry Teacher Guide is newly revised and contains 18 labs that have been specifically designed to support student inquiry, as well as AP® and IB® curriculum*. This manual is available in a print version and an all-digital version.

- Most labs can be completed in one lab session with readily available materials, including the Biology Lab Stations on the opposite page.
- Easy and meaningful data collection leads to increased time for data analysis and discussion.
- Labs integrate high-order analysis and synthesis questions.
- Includes sample data for investigations and inquiry, answers to analysis and synthesis questions, an assessment rubric, teacher tips, lab preparation information, and more.

Advanced Biology Lab Experiments	Starter Lab Station (EB-6334)	Starter and Extension Lab Stations (EB-6334, EB-6335)	IB® Standards*	Targeted AP® Learning Objectives*
1A. Enzyme Activity (Oxygen)	●	●	2.5	1-2.B; 2-1.F; 2-1.G; 4-3.A
1B. Enzyme Activity (Pressure)		●	2.5	1-2.B; 2-1.F; 2-1.G; 4-3.A
1C. Enzyme Activity (Spectrometer)**		●	2.5	1-2.B, 2-1.F, 2-1.G, 4-3.A
2. Diffusion	●	●	1.4; 10.3	2-1.C; 2-2.C; 2-2.F; 2-2.I
3. Osmosis		●	1.4	2-1.C; 2-2.C; 2-2.F; 2-2.H; 2-2.I; 2-3.A; 2-3.B; 2-3.D; 3-3.A; 3-3.B
4. Plasmolysis		●	1.4	2-2.D; 2-2.F; 2-2.H; 2-2.I
5. Cell Size		●	1.1	1-2.B; 2-1.A; 2-1.B; 2-2.I
6. Homeostasis	●	●	N/A	2-1.M; 2-3.A; 2-3.B, 2-3.D; 3-3.A; 4-3.D
7. Cellular Respiration	●	●	2.8	1-2.B; 2-1.H; 2-1.K; 2-2.K; 4-1.E; 4-1.F
8. Photosynthesis	●	●	2.9	2-1.A; 2-1.I; 2-1.J; 2-1.O; 4-3.A
9. Plant Pigments		●	2.9	2-1.A; 2-1.I; 2-1.J; 2-2.A; 2-2.K; 2-4.C; 4-1.F; 4-3.A
10. Transpiration	●	●	9.1	2-1.A; 2-2.H; 2-2.I; 2-3.A; 2-3.D; 4-3.D
11. Mitosis	***No sensors required***		1.6	3-1.B; 3-1.C; 3-1.D; 3-1.K
12. Meiosis			3.3; 10.1	3-1.F; 3-1.G; 3-1.H; 3-1.I; 3.1K; 3-4.A; 4-3.C
13. Energy Dynamics	●	●	4.2	2-1.A; 2-1.H; 2-1.I; 2-4.B; 4-1.G
14. Artificial Selection	***No sensors required***		N/A	1-1.C; 1-1.D; 1-1.E; 1-1.F; 1-3.A
15. BLAST Bioinformatics			3.1; B.5	1-1.H; 1-1.M; 1-1.N; 1-2.B; 1-2.C; 1-3.A; 1-3.B; 1-3.C
16. Population Genetics			10.3	1-1.C; 1-1.H; 1-1.I; 1-1.K; 1-1.M
17. Mathematical Modeling of Evolution			10.3	1-1.C; 1-1.E; 1-1.H; 1-1.K; 1-1.L; 1-3.A
18. Animal Behavior			A.4	2-3.D; 2-4.B; 3-5.A; 4-1.G

* AP is a registered trademark of the College Board, which was not involved in the production of, and does not endorse, this product. IB is a registered trademark of the International Baccalaureate Organization, which was not involved in the production of, and does not endorse, this product.

** Requires Spectrometer (PS-2600), sold separately.

Order Information

Advanced Biology Through Inquiry Teacher Guide PS-2852A

Includes lab prep instructions, expected answers/results, and editable student files. Manual is available in eco-friendly digital format or in print.

Biology Lab Stations Support Advanced Biology

The Biology Starter and Extension Lab Stations, together with PASCO's *Advanced Biology Through Inquiry Lab Manual,* offer a truly complete Biology solution. With over 25 sensor-based labs that cover a range of Biology and Advanced Biology topics, plus all of the equipment and apparatus required to conduct the labs hands-on, inquiry with data collection and analysis has never been easier or more affordable. For investigations in Physiology, add the Physiology Bundle and extend your studies even further.

Biology Station Lab Titles

Together, the Biology Starter and Extension Lab Stations support over 20 Advanced Biology labs. Conduct the 10 labs below right out of the box.

1. **Enzyme Action**
2. **Membrane Permeability**
3. **Osmosis**
4. **Plant Respiration & Photosynthesis**
5. **Respiration of Germinating Seeds**
6. **Acid Rain**
7. **Regulation of Body Heat**
8. **Plant Pigments**
9. **Cell Size**
10. **Cellular Respiration in Yeast**

Biology Starter (left) and Extension Lab Stations (right)

The Biology Starter & Extension Lab Stations include these wireless sensors and materials:

- Temperature
- Pressure
- pH
- CO_2
- Storage Case
- Lab Manual*
- Optical Dissolved Oxygen
- Colorimeter & Turbidity
- Conductivity Sensor
- EcoChamber

Physiology Extension Bundle

PS-2935D

The Physiology Extension Bundle enables students to study the heart cycle, lung function, human respiration, stimulus and response, homeostasis, and more! This bundle includes a Wireless EKG Sensor, a Wireless Spirometer, Spirometer Mouth Pieces, a Wireless Blood Pressure Sensor with Standard Cuff, and a Wireless Hand-Grip Heart Rate Sensor.

1. Wireless EKG Sensor PS-3236
2. Hand-Grip Heart Rate PS-3206
3. Wireless Blood Pressure PS-3218
4. Wireless Spirometer PS-3234
5. Spirometer Mouth Pieces PS-2522

Order Information

Biology Starter Lab Station.....EB-6334

Biology Extension Lab Station.....EB-6335

Wireless Physiology Extension Bundle.....PS-2935D

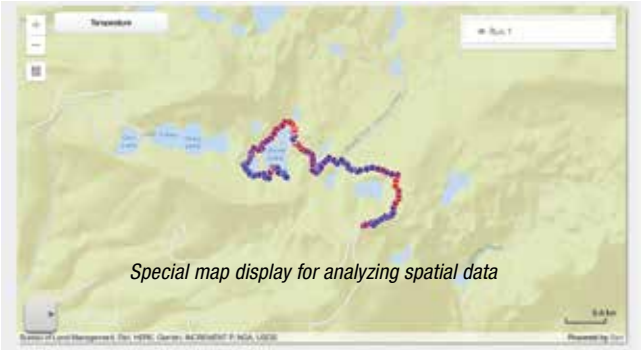
Biology Starter and Extension Lab Stations come standard with 10 Essential Biology Through Inquiry Labs. The Advanced Biology Through Inquiry Lab Manual is sold separately (see page 38 for order information).

Wireless Weather Sensor with GPS

PS-3209

The Wireless Weather Sensor is an all-in-one instrument for monitoring complex environmental conditions. It houses several sensing elements within a single unit to provide 19 different measurements. Use the sensor in logging mode with the Weather Vane Accessory for long-term monitoring, or use it as a handheld instrument to study microclimates and local phenomena. The collected data can be wirelessly exported to most devices, including classroom device dashboards, making it easier to support group activities that are constrained by time. Plus, with the built-in GPS, students can collect and analyze location data using the SPARKvue map display, powered by ESRI ArcGIS.

Student-friendly weather dashboard to visualize its multiple sensors.



Special map display for analyzing spatial data

esri Partner Network

With ESRI's ArcGIS online you can visualize data in seconds with a FREE account!

Weather Vane Accessory sold separately.

Order Information

Wireless Weather Sensor with GPS PS-3209

Wireless Weather Sensor with GPS Pack.....PS-3340

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Weather Vane Accessory.....PS-3553

Wireless Soil Moisture Sensor

PS-3228

The Wireless Soil Moisture Sensor measures the volumetric water content (%VWC) of soil, reporting data in real time or storing it onboard the sensor's memory for long-term experiments. Durable and easy to use, the Wireless Soil Moisture Sensor is the perfect tool for monitoring controlled experiments in the classroom and long-term experiments outdoors. From experiments in evaporation and soil composition to water consumption and plant competition, the Wireless Soil Moisture Sensor makes it easy for students to investigate a wide array of topics over the course of minutes, hours, or days!

Features:

- Collect and display data in real time within PASCO Capstone or SPARKvue software
- Automate data collection for hours, days, or weeks with remote Logging Mode
- Bluetooth connectivity enables use in the classroom, lab, or field
- Supports use of GPS data from a mobile device for GIS mapping activities
- Selectable calibrations for predominantly sandy soils, clay soils, and loamy soils

Order Information

Wireless Soil Moisture Sensor.....PS-3228

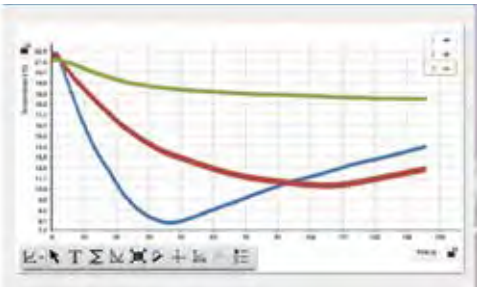
Wireless Temperature Sensor

PS-3201

Welcome to the modern thermometer. The Wireless Temperature Sensor transmits live data and allows students to continuously monitor, log, and plot temperature measurements on nearly any device. When lab-time ends but the experiment continues, students can set the sensor to log data autonomously for days, weeks, or months, then download it for analysis later. This durable, wireless sensor features a stainless steel probe for the most demanding of applications, as well as a battery that lasts over a year*. It can be used in a wide array of experiments and activities because it measures small, but significant temperature changes produced by chemical reactions, convection currents, and even skin temperatures.

Features:

- Simply pair and go, no cables or adapters to manage
- Variable sampling rate for capturing small, fast changes or experiments that run for hours, days, or weeks
- Bluetooth® connectivity and long-lasting coin cell battery
- Logs temperature data directly onto the sensor for long-term experiments
- Dust, dirt, and sand-proof and water resistant (IP-X7 certified)



Order Information

Wireless Temperature Sensor.....PS-3201

Wireless Temperature Sensor Pack.....PS-3330

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless pH Sensor

PS-3204

The Wireless pH Sensor is a must-have for any chemistry, biology, or environmental science course. Equally capable in the lab or field, the sensor eliminates the hassle of cables, reducing spills and improving safety. Plus, it rarely requires charging; the sensor's coin cell battery lasts for 2-3 years in most labs and costs about one dollar to replace. It can transmit data in real time, or store data for days when continuous monitoring is required. The Wireless pH Sensor enhances countless activities, including acid-base titrations, investigations into household chemicals, analyses of chemical reactions, water quality studies, and much more.

Features:

- Simply pair and go, no cables or interfaces to manage
- Compatible with ion-selective electrodes (ISE) and the oxidation reduction probe (ORP)
- Bluetooth® connectivity and a long-lasting coin cell battery
- Logs pH data directly onto the sensor for long-term experiments
- Wirelessly connects to SPARKvue and PASCO Capstone for convenient analysis and lab reports

SPARKvue lets students get the most out of their measurements, displaying them as digits, graphs, tables, or bar charts.

Order Information

Wireless pH Sensor.....PS-3204

Wireless pH Sensor Pack.....PS-3331

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Conductivity Sensor

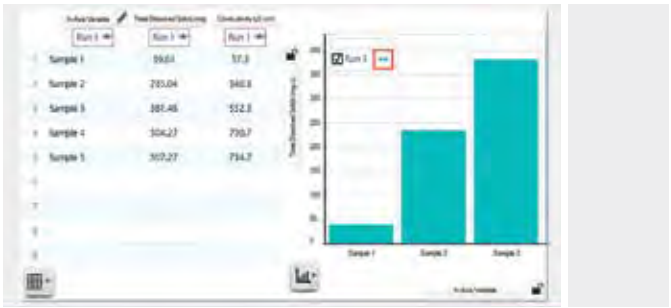
PS-3210A

The Wireless Conductivity Sensor measures the electrical conductivity of an aqueous solution. It is ideal for investigating the properties of solutions, including total dissolved solids (TDS) for water quality inquiry. Because it is temperature compensated, calibrations are less frequent and can be applied across a range of temperatures. With an improved range of 0 to 40,000 µS/cm, this sensor can be utilized for chemical, biological, and environmental studies.

Teacher tip: To measure brackish or marine samples, perform a dilution until the measurement falls within the range, then multiply to determine sample conductivity.

Features:

- Measure conductivity and total dissolved solids
- Automatic temperature compensation
- Battery life >1 year
- Remote logging with built-in memory
- Dust-proof, sand-proof, and water-resistant (1 meter for 30 minutes)



Order Information

Wireless Conductivity Sensor PS-3210A

Wireless Conductivity Sensor Pack.....PS-3332

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

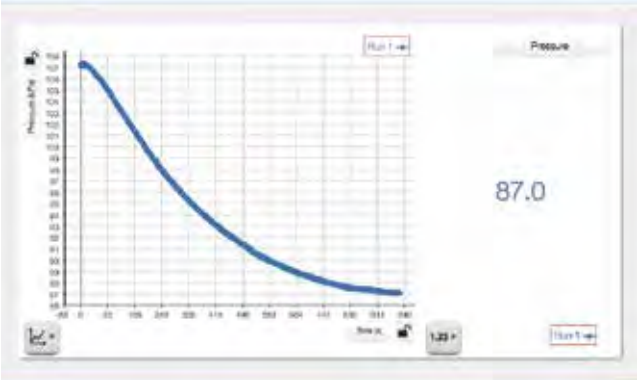
Wireless Pressure Sensor

PS-3203

The Wireless Pressure Sensor allows students to easily collect accurate gas pressure data for a wide range of applications. Included is a 60cc syringe, tubing, and connectors that facilitate experiments such as Boyle's Law or measuring pinch-grip strength. Within PASCO's software, students can easily select their desired units from a list containing kPa, mmHg, inHg, mbar, psi, atm, and torr.

Features:

- Measures pressure even when the pressure within the system drops below ambient pressure
- Supports common units (kPa, atm, psi, mmHg, or N/m^2) for many applications
- Bluetooth® connectivity and long-lasting rechargeable battery



Order Information

Wireless Pressure Sensor PS-3203

Wireless Pressure Sensor Pack.....PS-3333

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Light and Color Sensor

PS-3248

The Wireless Light and Color Sensor features two separate apertures: One measures ambient light from the side of the box, and the other measures percent color of directional light at the end of the box.

Features:

- Wirelessly connects to computers, Chromebooks, tablets, and smartphones
- Simply pair and go, no cables or adapters to manage
- On-board memory enables the sensor to function as an independent datalogger
- Variable sampling rate for short, precise experiments or lengthy, multi-day data collection
- Bluetooth® connectivity and long-lasting coin cell battery
- Indirect PAR measurements for biological studies

Order Information

Wireless Light and Color Sensor.....PS-3248
Wireless Light Sensor Pack.....PS-3338
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Diffusion/Osmosis Kit

ME-6942

It is an image that appears in practically every biology text to help students with conceptual understanding: a U-shaped tube with a permeable membrane separating a hypotonic and hypertonic solution. And yet few classroom methods of studying osmosis take advantage of this simple and elegant design for lab work.

Features:

- Plastic rather than glass columns for durability and student safety
- Free standing unit requires no additional lab equipment to hold it in place
- Air tight joints prevent pressure leaks
- Membranes are quick and easy to replace when compromised
- Graduated transparent columns allow changes in volume to be seen and quantified
- The U-shaped design provides familiarity for students and the straight columns keep the volume of gas above the fluid constant
- Great for determining colligative effects on osmotic pressure

Wireless Temperature Sensor Link

PS-3222

The Wireless Temperature Sensor Link enables wireless connection for any PASCO temperature probe with a 3.5 mm connection. The link comes with a Fast Response Temperature Probe, but it can also connect to the Stainless Steel Temperature Probe, Skin/Surface Temperature Probe, the Absolute Zero Sphere, and the Ideal Gas Law Apparatus.

Order Information

Diffusion/Osmosis Kit.....ME-6942
Wireless Temperature Sensor Link.....PS-3222

Wireless CO_2 Sensor

PS-3208

Measure changes in carbon dioxide (CO_2) gas levels quickly and easily with the Wireless CO_2 Sensor. This temperature-compensated sensor can operate in high humidity environments and employs live data to make core labs, such as photosynthesis, cellular respiration, and metabolism experiments engaging and impactful. With the ability to store more than 55,000 data points, the Wireless CO_2 Sensor also supports long-term studies of carbon cycling that span the course of a single night or an entire weekend. Includes 250-mL sample bottle that allows gases to be analyzed with multiple sensors.

Features:

- Logging ability for long-term experiments, store up to 55,000 data points
- Integrated stopper for use with included sample bottle and common glassware
- Temperature compensated for increased accuracy

Order Information

Wireless CO_2 Sensor (Carbon Dioxide) PS-3208

Wireless CO_2 Sensor Pack PS-3341

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Oxygen Gas Sensor

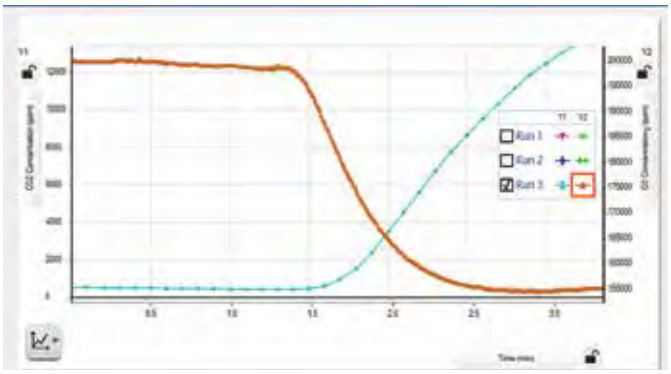
PS-3217

The Wireless Oxygen Gas Sensor measures gaseous O_2 concentrations as well as humidity and air temperature for a range of biology, environmental science, and physiology activities.

The Wireless Oxygen Gas Sensor is accurate and easy to use, making it the perfect sensor for studying photosynthesis, respiration, and oxygen cycling in a closed or open system. With remote logging, experiments can go beyond the lab period and easily give students hours or days of data for analysis. In addition to measuring oxygen gas levels, the Wireless Oxygen Gas Sensor also contains sensors to measure ambient temperature and humidity.

Features:

- Bluetooth® and USB connectivity
- 0-100% Oxygen Gas Concentration
- ±1% Oxygen at constant temperature and pressure
- Also reports ambient temperature and humidity
- 2-3 year operating life with replaceable sensing element



Metabolism Chamber

ME-6936

The Metabolism Chamber is a 250 mL sample bottle with 2 holes cut specifically for PASCO gas sensors to allow simultaneous measurements of carbon dioxide gas and oxygen gas.

Order Information

Wireless Oxygen Gas Sensor.....PS-3217

Metabolism Chamber.....ME-6936

Photosynthesis Chamber

PS-3251

PASCO's Wireless Optical Dissolved Oxygen Sensor (PS-3246) allows students to monitor most common photosynthesis experiments. Typical experiments require students to infer photosynthetic rate changes by using chloroplasts and dye. Help your students better understand photosynthesis via direct measure of oxygen while controlling light, temperature or nutrients. Ideal for exploring aquatic plants, algal beads, and even the consumption of oxygen by respiration.

The lid features three convenient ports for sensors; stoppers are included to maintain a closed system. The ports will accommodate Wireless Temperature Sensor (PS-3201), Wireless Conductivity (PS-3210A), Wireless pH Sensor (PS-3204) or other ion selective electrodes for additional measurements. A clear inner chamber allows full sunlight exposure, or set into an outer cover chamber to block out light.

Dual chambers allow sample to set in temperature controlling water bath.

Nine separate LED lights (white, red, green or blue) allow students to test these variables and others such as plant nutrient uptake and elimination

Order Information

Photosynthesis Chamber PS-3251

Wireless Optical Dissolved Oxygen Sensor

PS-3246

The Wireless Optical Dissolved Oxygen (ODO) Sensor is ideal for monitoring DO_2 in the lab or field. The Wireless Optical DO Sensor contains three different probes. In addition to the dissolved oxygen sensor, it also includes probes for measuring atmospheric pressure and water temperature. The optical technology is accurate, fast, and does not require stirring, filling solutions, warm-up, or frequent calibration.

NOTE: The included waterproof probe is submersible to a depth of 2.5m. The (white) wireless sensor box is not waterproof.

Order Information

Wireless Optical Dissolved Oxygen Sensor (NEW!)PS-3246

EcoZone System

ME-6668

PASCO's EcoZone System is designed to help students model and understand complex interactions within, and among, different ecosystems. The three clear, acrylic EcoChambers are specially designed to accommodate PASCO sensors, making qualitative and quantitative measurements easily accessible. The three chambers connect to allow students to study up to three different ecosystems.

Features:

- Total volume of each chamber is 4534 cubic centimeters
- Sturdy construction designed for easy setup and cleanup
- Quantitatively study the interaction of different ecosystems
- Custom molded for use with PASCO sensors
- Clear acrylic allows for observations from all sides

Order Information

EcoZone System ME-6668

EcoChamber ME-6667

Wireless Polarimeter

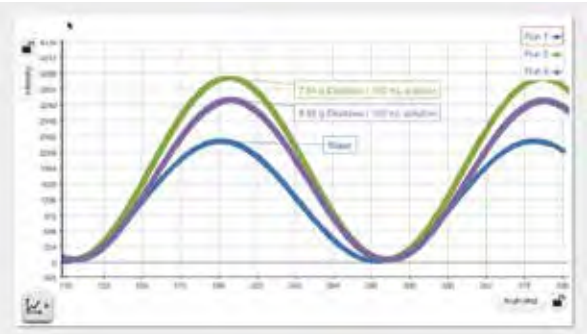
PS-3237

The Wireless Polarimeter has both Bluetooth® and USB connectivity, making it possible to analyze chiral compounds with your iPad®, Chromebook™, Android tablet, or computer. It is ideal for introductory experiments in Organic Chemistry and Biochemistry, where chiral compounds are of special interest.

PASCO's Wireless Polarimeter passes plane polarized light through a vertical sample, which contains a chiral compound, followed by an analyzer and detector. The optical rotation is determined by finding the angle between the starting position and the location where the optimum light level transmits through the cross polarizer. Students can use the rotation data to calculate the concentration of a chiral sample, while the specific rotation (amount turned per g/ml dissolved) is an intrinsic property that can be used to differentiate molecules or determine racemic mixtures.

Specifications:

- **Connectivity:** Bluetooth and USB
- **LED light source:** 589 nm
- **Optical Rotation Accuracy:** ±0.09°
- **Cell Length:** 101.3mm ± 0.8mm



Order Information

Wireless Polarimeter.....PS-3237

Wireless Colorimeter & Turbidity Sensor

PS-3215

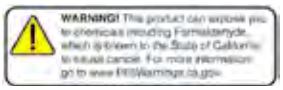
The Wireless Colorimeter & Turbidity Sensor simultaneously measures the absorbance and transmittance of six different wavelengths. The sensor can be used to study Beer's Law (absorbance vs. concentration), enzyme activity, photosynthesis, and the rates of chemical reactions (absorbance vs. time). After a simple calibration, students can quickly begin viewing live measurements as they materialize across the visible spectrum at 650 nm (red), 600 nm (orange), 570 nm (yellow), 550 nm (green), 500 nm (blue), and 450 nm (violet).

This sensor also functions as a high-quality turbidimeter for water quality analysis. Rather than simply measuring transmitted light, the Wireless Colorimeter and Turbidity Sensor measures light scattered at a 90° angle from the sample, resulting in accurate and repeatable measurements. When used with our ezSample water test kits, chemical concentrations can be determined using the calibration curves included in PASCO software.

Features:

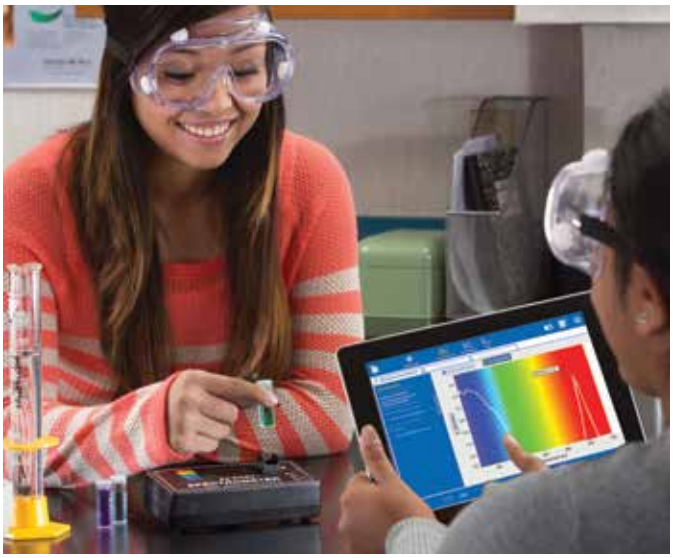
- Stabilized light source for consistent readings
- PASCO software displays the absorbance & transmittance at each wavelength in the appropriate color
- Quick and easy calibration
- Functions as both a colorimeter and turbidimeter
- Built-in calibrations report concentrations of Ammonia, Nitrate, Phosphate, and Iron in parts per million using ezSample Kits.

Measure the absorbance and transmittance of a solution at six different wavelengths... simultaneously!



Order Information

Wireless Colorimeter & Turbidity Sensor.....PS-3215
Includes USB charging cable, 9 cuvettes, 2 cuvette racks, and one 100 NTU calibration cuvette.
Wireless Colorimeter & Turbidity Sensor Pack PS-3334
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*



Wireless Spectrometer (VIS)

PS-2600A

The award-winning PASCO Wireless Spectrometer is specifically designed for modern chemistry, biology, and physics labs. It connects to student devices via USB or Bluetooth Low Energy and includes free Spectrometry software with built-in tools for spectral analysis. Scan times are fast, enabling students to collect a full spectrum of data in less than a second. Three plots are provided for common applications, including Absorbance vs. Wavelength (or Intensity vs. Wavelength), Absorbance vs. Concentration (Beer's law), and Absorbance vs. Time (kinetics).

Perform these labs with the PASCO Spectrometer:

- Photosynthesis with DPIP
- Absorption spectra of plant pigments
- Concentration of proteins in solution
- Rate of an enzyme-catalyzed reaction
- Growth of a cell culture

Includes USB charging cable, 10 cuvettes, and Spectrometry Software.

Order Information

Wireless Spectrometer (Vis) PS-2600A

UV-Vis Spectrometer

SE-3607

The SE-3607 is an easy-to-use, wide range UV-Vis spectrometer that delivers fast, accurate and reliable performance for routine analyses in chemistry and biochemistry teaching labs. With USB connectivity and cross-platform Spectrometry Software, the PASCO UV-Vis Spectrometer improves collaboration between lab members, enabling data collected on a computer or laptop to be analyzed on tablets, iPads, and Chromebooks*. Additional accessories, such as the Quartz Fiber Optic Cable Set, can be used to extend the spectrometer's capabilities for the analysis of emission spectra, light sources, and the classification of lasers.

Highlights:

- Spectral scans from 180 to 1050 nm
- Award-winning Spectrometry software
- One-click light and dark calibrations
- Adjustable scan averaging, signal integration time, and smoothing
- Displays entire spectra with each scan
- Graphs Absorbance vs. Wavelength
- Graphs Intensity vs. Wavelength (emission spectra)
- Graphs Absorbance vs. Concentration (Beer's Law)
- Graphs Absorbance vs. Time (kinetics)

Semi-Micro Volume Cuvettes (Qty. 10), Cuvette Rack (EC-3590), USB-A to USB-B Cable, External AC Adapter, 24 V Power Supply, Foam Lined Carrying Case (ABS).

UV Quartz Cuvettes (Qty. 2)

Sold Separately

UV-Vis Fiber Optic Cable Set

Sold Separately

Order Information

UV-Vis Spectrometer.....SE-3607
UV Quartz Cuvettes (Qty. 2).....SE-3611
UV-Vis Fiber Optic Kit.....SE-7182

Wireless Hand-Grip Heart Rate Sensor

PS-3206

With these wireless hand grips, conducting physiology labs on the cardiovascular system or homeostasis is easier than ever before. Continuously monitor heart rate during exercise, or use the sensor to take initial and final measurements with fast and reliable heart rate detection.

Order Information

Wireless Hand-Grip Heart Rate Sensor.....PS-3206

Wireless Exercise Heart Rate Sensor

PS-3207

The Wireless Exercise Heart Rate Sensor has a chest strap and will transmit data wirelessly up to 10 m away! The electrode belt fits around the ribcage (worn against the skin for best results, but can be worn over a shirt if a drop of saline solution is applied under the electrodes). Live and recorded data can be analyzed using any device with PASCO software installed.

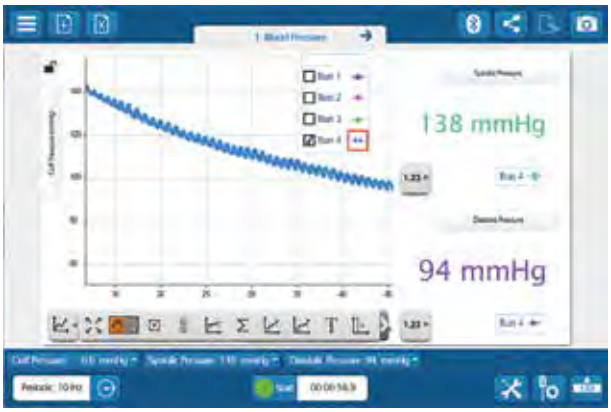
Order Information

Wireless Exercise Heart Rate Sensor.....PS-3207

Wireless Blood Pressure Sensor with Standard Cuff

PS-3218

PASCO's Wireless Blood Pressure Sensor allows students to quickly and easily measure both systolic and diastolic arterial blood pressure (mmHg) as well as heart rate (pulse in bpm). Comparing the digits display for systolic and diastolic pressure with the display of blood pressure from the real-time graph helps students gain a contextual understanding of the physiology of blood pressure.



Observe heart rate plus systolic and diastolic blood pressure

Order Information

Wireless Blood Pressure Sensor with Standard Cuff.....PS-3218

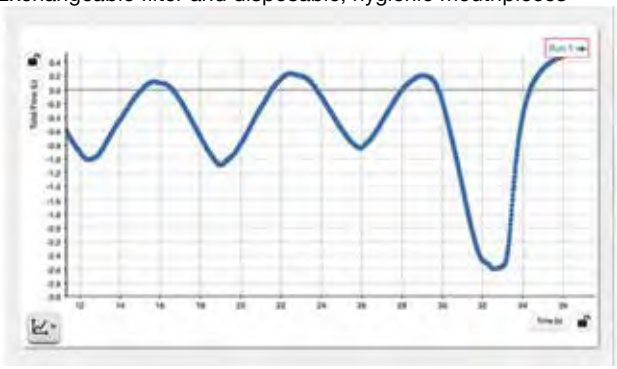
Wireless Spirometer

PS-3234

The Wireless Spirometer Sensor makes it safe and easy for students to collect respiratory measurements, including flow rate, pressure, and lung volume. Ideal for studies in health and human physiology, the Wireless Spirometer Sensor streamlines experiments by providing students with real-time data, interactive graphs, and intuitive analysis tools right on their devices. The disposable mouthpieces are designed for use with a single student and feature exchangeable filters that protect the sensor from particulates for maximum safety. Additional mouthpieces are available in convenient packs of ten.

Features:

- Bi-directional air flow (inspiration and expiration)
- Minimal resistance to air flow
- Displays volume in liters
- Exchangeable filter and disposable, hygienic mouthpieces



Order Information

Wireless Spirometer	PS-3234
Spirometer Mouthpiece Replacements (10)	PS-2522
Spirometer Mouthpieces & Pre-Filters	PS-3245

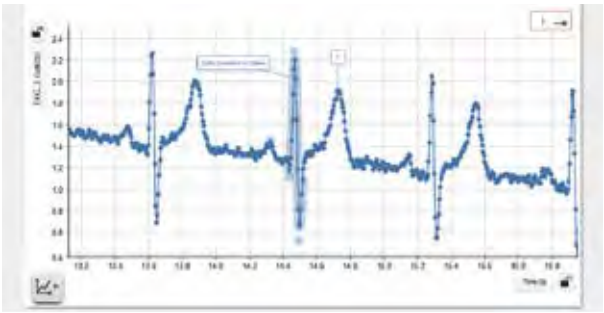
Wireless EKG Sensor

PS-3236

The Wireless EKG Sensor measures electrical signals produced by contractions of the heart or muscles, and reports them in real-time on virtually any student device. The perfect sensor for fast-paced physiology courses, the EKG Sensor provides students with real-time feedback as they explore the effects of various stimuli on cardiac or muscular activity. Heart Rate data is reported in beats per minute (BPM), while the voltage (mV) detected from cardiac contractions is intuitively displayed in an EKG trace.

Features:

- Standard three-electrode design
- Easy-to-use, disposable stick-on electrodes
- No messy gel required
- Great for stimulus response reflex studies



Order Information

Wireless EKG Sensor	PS-3236

Go Wireless with PASPORT Sensors

PASCO's AirLink Interface connects PASPORT (blue) sensors to your computer using Bluetooth or USB technology.

AirLink Interface

PS-3200

The AirLink connects PASPORT sensors to a Mac or Windows computer, Chromebook, iPad, tablet, or smartphone via Bluetooth or USB connection. The USB cable is included.

Order Information

AirLink Interface PS-3200

Human Eye Model

OS-8477A

The Human Eye Model makes it easy for students to explore the physiology behind human sight through hands-on manipulation. Investigate normal vision, far-sightedness, and more!

Features:

- **Working Model of the Human Eye:** Two lenses are used to form images on the retina. Sealed tank holds water to simulate the vitreous humor. Size and orientation of the illuminated object can be easily measured.
- **Study the Optics of Normal Vision and Vision Correction:** Use the included plastic lenses to create images for normal vision, far-sightedness, near-sightedness, and astigmatism. Additional lenses are placed in front of the eye to correct for vision problems.
- **Fixed Corneal Lens and Interchangeable Crystalline Lens:** The crystalline lens is surrounded by water (vitreous humor). By changing the crystalline lens, the eye can focus on both near and far objects.
- **Movable Retina:** Three positions demonstrate near-sightedness, far-sightedness, and normal vision.
- **Variable Pupil Size:** Students can observe changes in image brightness and clarity as the pupil size is reduced.

Includes molded plastic eyeball, plastic lenses (two sets of 6), pupil aperture, adjustable focal lens, retina screen, optics caliper (1), syringe, and experiment manual.

Order Information

Human Eye Model.....OS-8477A

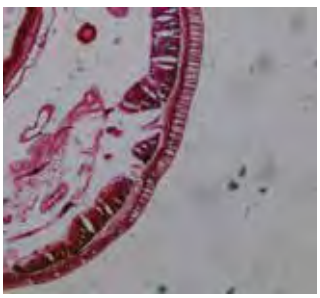
Standard Compound Optical Microscope

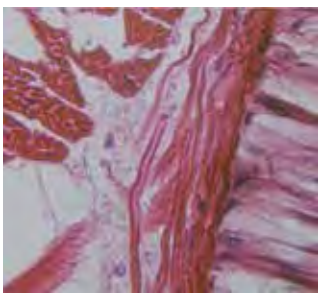
SE-6213

Standard optical microscope great for general viewing of cell structures at 40x, 100x, 400x viewing. Gives insights to topics from Biology, Life Science, Anatomy and Physiology, Cellular and Field Biology. High quality optical lenses allow for fine details in high contrast can be studied in appropriate detail for starter to experienced microscope users. Perfect for establishing labs with sets of durable equipment classes can use for years. Compatible with student or professionally prepared slide set like the Microscope Slide Kingdom survey (SE-6214) gives students a solid start to explore cellular features and concepts across all living kingdoms.

Features:

- Observe small specimens like plant, animal, and bacterial cells, translucent objects such as insect larvae, or fine particles like powder
- 10 x eye piece
- 10x eyepiece and 4x, 10x, and 40x (oil) objective lenses provide magnification options of 40x, 100x, and 400x
- Adjustable focus between coarse and fine settings
- Dual light source (upper and lower LED) provides adjustable brightness
- Cord or cordless power options (External AC/DC Adaptor or 3xAA Batteries)
- Equipped with a plain stage with clip and single lens condenser with disc diaphragm





Sample imagery above captured with standard eyepiece USB camera. Slides from the *Kingdoms Survey,Prepared Slide Set* (sold separately)

Order Information

Standard Compound Optical Microscope.....SE-6213

Prepared Slide Set, Kingdoms Survey SE-6214

Monocular Digital Microscope (40-1000x)

SE-6201

This compound microscope and digital camera combination includes a 100x oil immersion lens, 1.25 N.A. Abbe condenser, and a rechargeable LED illumination system. Motic Images software included. Use with Windows 7 and above. Mac OSX Compatible.

Note: See online for other microscope options including a Tri-Power Stereo Microscope (10X/20X/40X) and a monocular Microscope (40-1000x) with a detachable 8" LCD tablet that can transmit live images to devices.

Order Information

Monocular Digital Microscope (40-1000x).....SE-6201

USB 3.0 Microscope Camera

SE-6204

This high-resolution camera permits you to use your own microscope to create still or moving microscope images on your PC. With the included Motic Images Plus software, you can view, enhance, label, measure, print, and store the images all with one program. This lightweight digital camera mounts over almost any microscope eyepiece (stereo or compound) with the supplied C-ring adapter and microscope eyepiece adapters. Provides 3.0 megapixels at 2048x1536 framed resolution, everything included for easy plug-and-play, for use with Windows 7 and above and OSX.

Moticam X3 (SE-6205) streaming high resolution WiFi camera also available. See the PASCO website for more details.

Order Information

USB 3.0 Microscope Camera SE-6204

WiFi Microscope Camera SE-6205

USB Camera Microscope

PS-2343

The versatile USB Camera Microscope is ideal for a variety of applications in the science classroom. Its dual functionality means it can take pictures just like a digital camera, but it can also magnify like a microscope when it's up close to a specimen.

Features:

- Built-in LED lights
- Optical zoom from 1x to 60x
- Can be used as a webcam

Order Information

USB Camera Microscope PS-2343

Chemistry

Educational solutions for General, AP®, IB®, and Honors Chemistry courses

Award-Winning Solutions for Your Chemistry Lab

PASCO provides chemistry educators with the most complete and innovative classroom solutions on the market. Our goal is to provide teachers with affordable, turnkey STEM solutions that combine versatile sensor technology with interactive, NGSS-based curriculum. Using SPARKvue® software and our wireless sensors, students can see data collection in real time and perform analyses on their own devices. Plus, our *Essential Chemistry* textbook and interactive e-book make it easy to reinforce student engagement at home and in the classroom.

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World Class Support and Professional Development - Committed to Your Success!

Chemistry Starter Lab Station

EC-6362

The Chemistry Starter Lab Station makes it easy and affordable to begin using sensor-based technology in your chemistry lab or classroom. Inside the Starter Lab Station are the wireless sensors used to perform lab activities from the Essential Chemistry Student Lab Manual. Available separately is the Chemistry Extension Lab Station (EC-6363) which, when combined with the Starter Lab Station, comprises all the wireless sensors students need to perform most of the labs inside the Essential Chemistry Student Lab Manual, plus many of the lab activities found in our Advanced Chemistry Through Inquiry Teacher Guide.

Chemistry Station Lab Titles

The Chemistry Starter Lab Station supports 7 of the 10 included labs. Add the Extension Lab Station* to do all 10 lab titles + over 50 more investigations from the Essential Chemistry Lab Manual.

1. **Physical or Chemical Change**
2. **Specific Heat**
3. **Chemical Reactions**
4. **Determining Limiting Reactions**
5. Types of Bonding*
6. **Evaporative Cooling**
7. Solution Concentration*
8. **What is pH**
9. **Investigation of Acid-Base Titration**
10. Lemon Battery*

Chemistry Starter (left) & Extension Lab Stations (right)

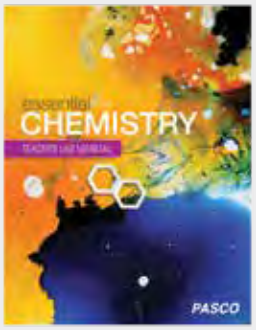
The Chemistry Starter & Extension Lab Stations include these wireless sensors and materials:

Starter
- Temperature
- Pressure
- pH
- Molecular Models
- Periodic Table
- Periodic Trend Cards
- Spectrum Cards
- Storage Case

Extension
- Drop Counter
- Colorimeter & Turbidity
- Conductivity
- Voltage
- Condenser
- Electrode Support

Order Information

Chemistry Starter Lab Station EC-6362
Essential Chemistry Extension Lab Kit.....EC-6363
Essential Chemistry Teacher Lab Manual EC-6330



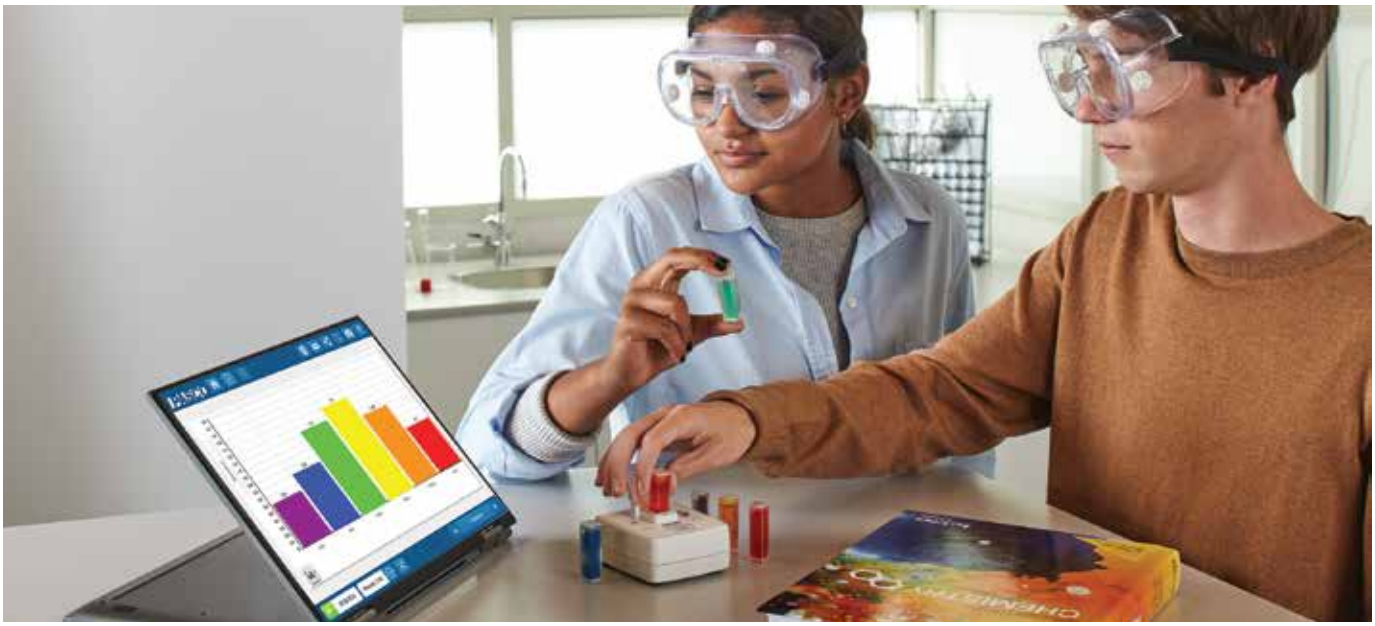
Essential Chemistry Teacher Lab Manual

EC-6330

The Essential Chemistry Teacher Lab Manual is a complete set of teacher answer keys for the 73 labs inside the Essential Chemistry Student Lab Manual (the printed student lab manual is sold separately). Each teacher key provides sample data, graphs, tables, and correct or sample responses to the analysis questions within each of the 73 student lab investigations. Below is a partial list of labs from the Essential Chemistry Lab Manual:

Experimental Variables
Density of a Liquid
Physical or Chemical Change
Specific Heat
Naming Ionic Compounds
Molar Mass
Percent Composition of a Hydrate
Empirical Formula of Magnesium Oxide
Chemical Reactions
Solubility Rules
Determining Limiting Reactants
Flame Tests
Lewis Structures and VSEPR
Evaporative Cooling
Hess's Law
Boyle's Law
Charles' Law
Solution Concentration
Catalysts
Le Châtelier's Principle
Titration of an Unknown Acid
Electrochemical Cells
Electroplating
Bonding and Organic Chemistry
+ 49 more labs available.

Your Complete Chemistry Solution



PASCO's *Essential Chemistry* curriculum is the only curriculum solution that includes a Student Textbook, Student e-Book, Teacher e-Resources, Student Lab Manual, Teacher Lab e-Resources, and Equipment Kits, all at a very affordable price. This 3-D STEM program includes a full year of instruction for both General and Honors Chemistry classes. Use our complete solution or integrate Essential Chemistry into your existing curriculum. Essential Chemistry is multiplatform and works on iOS, Android™, Chrome™, Windows®, and Mac®. What's more, it includes 24/7 online access, as well as correlations to NGSS and your state standards.

Student Textbook & Lab Manual

- 24 chapters cover a full year of instruction for General and Honors Chemistry
- One main idea per page
- Quality illustrations
- Section and Chapter Reviews
- 73 complete investigations
- 4 Design Projects

Student e-Book

- Browser-based version of the textbook
- Same layout with convenient 24/7 online access
- Embedded videos and animations bring content to life
- Interactive equations and simulations enrich key concepts
- Formative and summative assessment questions

Teacher e-Resources for Lab Manual

- Editable documents
- SPARKvue Software
- PowerPoint presentations
- Answer keys
- Video lab assistance

Teacher e-Resources for Textbook

- Infinite Test Bank
- Teacher User Guide
- Teacher e-Book (1-year or multi-year license)
- Alignment details for NGSS and state standards

PASCO Academy Chemistry Resources

- Available through your PASCO Educator account
- 25 engaging video labs with detailed instruction and data collection
- 25 datasets for student analysis and discussion
- 25 editable lab handouts with teacher answer keys
- Digital access to more than 70 labs for General and Honors Chemistry

Equipment

- Standard Equipment Kit supports 47 labs
- Extend your investigations with additional sensors and apparatus

Essential Chemistry correlates with NGSS and is constructed around the three dimensions:

- Science and Engineering Practices
- Crosscutting Concepts
- Disciplinary Core Ideas

Textbook + e-Book + Equipment

Essential Chemistry Student Textbook

EC-6350

This rigorous yet accessible textbook includes core Chemistry topics that cover a complete year of instruction. The lessons follow the 5E model and include tools for ELL students, as well as tools for students with different learning styles. Fully aligned with both general and advanced coursework, this accessible textbook features one main idea per page, quality illustrations, 73 complete investigations, four Engineering Design Projects, and Section and Chapter Reviews. The 24 chapters cover these topics:

- The Science of Chemistry
- Measurement and Analysis
- Classifying Matter
- Temperature and Heat
- Chemical Compounds
- Moles
- Chemical Reactions
- Stoichiometry
- Atomic Structure
- Bonding and Valence
- Energy and Change
- Gases
- Solutions
- Reaction Rates
- Equilibrium
- Acids and Bases
- Oxidation and Reduction
- Electrochemistry
- Nuclear Chemistry
- Organic Chemistry
- Molecular Biology
- Biochemistry
- The Earth
- The Universe

Essential Chemistry Student e-Book

EC-6350-EB5 (5-yr lic) or EC-6350-EB1 (1-yr lic)

The e-Book is an electronic version of the full textbook plus interactive elements. Throughout the electronic text, content and theory are supported with optional audio reading, as well as interactive elements such as interactive equations, videos, animations, and simulations. Students may also expand content using the 'more' button to go deeper into concepts.

Essential Chemistry Student Lab Manual

EC-6352

The *Essential Chemistry* Student Lab Manual is a student-consumable print book. In the manual there are 73 labs that cover a full year of instruction. Best of all, the labs are completely integrated with PASCO equipment and software.

Essential Chemistry Lab Station Equipment Kits

EC-6362 & EC-6363

These equipment kits will outfit a single chemistry lab station of 2-5 students. When used in conjunction with the Essential Chemistry program, including the e-Book and lab manual, they create a complete solution for teaching high school chemistry. The equipment kits can also be used to supplement your existing textbook, serving as the lab components of your curriculum. This use is supported by the more than 70 standards-based Essential Chemistry labs that are available for free download in the PASCO Experiment Library.

AWARD WINNING EQUIPMENT

Essential Chemistry Lab Station Equipment

42 labs are designed to use this equipment set.

Includes 1 of each of the following:

• Wireless Temperature Sensor	PS-3201
• Wireless pH Sensor	PS-3204
• Wireless Conductivity Sensor	PS-3210
• Wireless Pressure Sensor	PS-3203
• Wireless Voltage Sensor	PS-3211
• Wireless Colorimeter and Turbidity	PS-3215
• Molecular Model Kit	PS-3400
• Electrode Support	PS-3505
• Periodic Trend Cards	EC-3405
• Periodic Table	EC-3404
• Spectrum Cards	EC-3403
• Condenser	PS-3402
• Wireless Drop Counter	PS-3214
• Gratnells® Storage Trays (2)	

**The equipment list (above) includes everything in the Chemistry Starter and Extension Lab Stations (EC-6362 + EC-6363).*

Order Information

Essential Chemistry 1st Edition: Student Textbook..... EC-6350A
Essential Chemistry 1st Edition: Student e-Book (1 yr license).. EC-6350-EB1
Essential Chemistry Student Lab Manual EC-6352
Essential Chemistry Teacher Lab Manual EC-6330
Essential Chemistry Lab Investigations - Teacher Res EC-6353-DIG
Essential Chemistry Starter Lab Station..... EC-6362
Essential Chemistry Extension Lab Kit EC-6363

Advanced Chemistry Through Inquiry Labs for AP® & IB®

PASCO's Advanced Chemistry through Inquiry Teacher Guide is newly revised and contains 16 labs that have been specifically designed to support student inquiry, as well as AP® and IB® curriculum*. This manual is available in both a print version and an all-digital version.

- Most labs can be completed in one lab session with readily available materials, including the sensor bundles on the opposite page.
- The flexible format provides guided inquiry opportunities and scaffolding, so students can create their own experiments.
- Easy and meaningful data collection leads to increased time for data analysis and open inquiry.
- Labs integrate high-order analysis and synthesis questions.
- Includes sample data for investigations and inquiry, answers to analysis and synthesis questions, an assessment rubric, teacher tips, lab preparation information, and more.

  Initial Investigation includes step-by-step procedure, questions, and analysis.

  Advanced Investigation presents a higher level experiment that expands on concepts from the Initial Investigation.

  Extended Inquiry includes student inquiry and experimental design questions with sample answers.

Advanced Chemistry Lab Experiments	Starter Bundle (PS-3302)	Starter and Extension Bundles (PS-3302, PS-3303C)	IB® Standards*	Targeted AP® Learning Objectives*
1. Analysis of Food Dyes in Sports Drinks		●	1.5; A.8	SAP-8.A; SAP-8.C
2. Investigating the Copper Content of Brass		●	1.2; 1.5; A.8	SAP-8.C; SPQ-4.A
3. How Hard is Your Tap Water?	●	●	1.4	SPQ-1.A; SPQ-2.A; TRA-1.C; SPQ-3.C; SPQ-4.A
4. How Much Acid is in Your Fruit Juice?	●	●	18.1; 18.4	SPQ-4.B; SPQ-4.A
5. Separating Food Dyes Using Chromatography		●	4.3	SPQ-3.B; SPQ-3.C; SPQ-5.A
6. A Chemistry Mystery: Name That Unknown	●	●	4.3; 4.5	SAP-3.A; SAP-5.B; SAP-3.D
7. Stoichiometry in Solutions	●	●	1.5	SPQ-3.A; SPQ-4.A; SPQ-4.B; SPQ-2.A; SAP-5.B
8. Percentage of H_2O_2 in Your Drugstore Hydrogen Peroxide		●	9.1; 9.2; 19.1	TRA-1.B; SPQ-4.A; SPQ-4.B
9. Investigating Physical and Chemical Changes of Matter	●	●	4.5	TRA-1.D; TRA-1.C; SAP-5.B
10. What Does Acid Rain Do To Coral Reefs?	●	●	6.1; A.8	TRA-3.A; TRA-3.C
11. Kinetics of Crystal Violet Fading		●	6.1; 16.1; 16.3	TRA-3.B; TRA-3.C; TRA-3.A
12. Building a Better Hand Warmer	●	●	5.1; 5.2; 5.3; 15.1	ENE-2.D; ENE-2.E; ENE-2.F
13. Applications of Le Châtelier's Principle	●	●	7.1; 7.2; 17.2; A.8	TRA-8.A; TRA-8.B
14. Investigation of Acid-Base Titrations	●	●	18.1; 18.4	SAP-9.E; TRA-1.B; SPQ-4.B; TRA-8.A
15. Introduction to Buffers	●	● **	18.2	SAP-10.B; TRA-1.C; SPQ-4.B; SAP-5.B
16. Evaluation of Lemonade as a Buffer	●	● **	18.2	SAP-10.D; SPQ-1.A

* AP is a registered trademark of the College Board, which was not involved in the production of, and does not endorse, this product. IB is a registered trademark of the International Baccalaureate Organization, which was not involved in the production of, and does not endorse, this product.

** The ORP Probe requires a pH sensor.

Order Information

Advanced Chemistry Through Inquiry.....PS-2828A

Includes lab prep instructions, expected answers/results, and editable student files. Manual is available in eco-friendly digital format or in print.

Lab Stations Support Advanced Chemistry

The Chemistry Starter Lab Station and Extension Station, together with PASCO's *Advanced Chemistry Through Inquiry Lab Manual,* offer a truly complete solution. With over 15 sensor-based labs covering a range of advanced chemistry topics, and all of the equipment and apparatus required to conduct the labs, hands-on inquiry with data collection and analysis has never been easier or more affordable. Add the Wireless Spectrometer and Oxidation Reduction Potential Probe to your Lab Stations to explore more IB® and AP® investigations.

The Chemistry Starter & Extension Lab Stations include these wireless sensors and materials:

Starter

- Temperature
- Pressure
- pH
- Molecular Model Kit
- Periodic Table
- Periodic Trend cards
- Spectrum Cards
- Storage Case

Extension

- Drop Counter
- Colorimeter & Turbidity
- Conductivity
- Voltage
- Condenser
- Electrode Support

PASPORT Ethanol Sensor

PS-2194

The PASPORT Ethanol Sensor measures the concentration of gaseous ethanol up to 3%. In biology and environmental science labs, students can learn about anaerobic respiration by measuring the production of ethanol by bacterial or yeast fermentation. Physics and chemistry students can begin to explore combustion and thermodynamics. Connect your students to the study of respiration and alternative energy sources with the PASPORT Ethanol Sensor.

Note: This sensor requires an interface for use. Compatible interfaces include the 550 Universal Interface, 850 Universal Interface, AirLink, and SPARKlink Air. See website for full details.

Oxidation Reduction Potential Probe

PS-3515

This probe connects to the Wireless pH Sensor and allows students to determine the capacity of a chemical species to act as an oxidizing or reducing agent during redox reactions.

Use this probe to monitor solutions during oxidation-reduction titrations, perform water quality studies, and study the effects of water chlorination. This probe is not a standalone sensor. It connects to and requires an amplifier.

Order Information

Essential Chemistry Starter Lab Kit	EC-6362
Essential Chemistry Extension Lab Kit	EC-6363
PASPORT Ethanol Sensor	PS-2194
Oxidation Reduction Potential Probe	PS-3515

Wireless pH Sensor

PS-3204

The Wireless pH Sensor is a must-have for any chemistry, biology, or environmental science course. Equally capable in the lab or field, the sensor eliminates the hassle of cables, reducing spills and improving safety. Plus, it rarely requires charging; the sensor's coin cell battery lasts for 2-3 years in most labs and costs about one dollar to replace. It can transmit data in real time, or store data for days when continuous monitoring is required. The Wireless pH Sensor enhances countless activities, including acid-base titrations, investigations into household chemicals, analyses of chemical reactions, water quality studies, and much more.

Features:

- Simply pair and go, no cables or interfaces to manage
- Compatible with ion-selective electrodes (ISE) and the oxidation reduction probe (ORP)
- Features Bluetooth® wireless connectivity and a long-lasting coin cell battery
- Logs pH data directly onto the sensor for long-term experiments
- Streams live data to SPARKvue and PASCO Capstone for instant visualization and analysis.

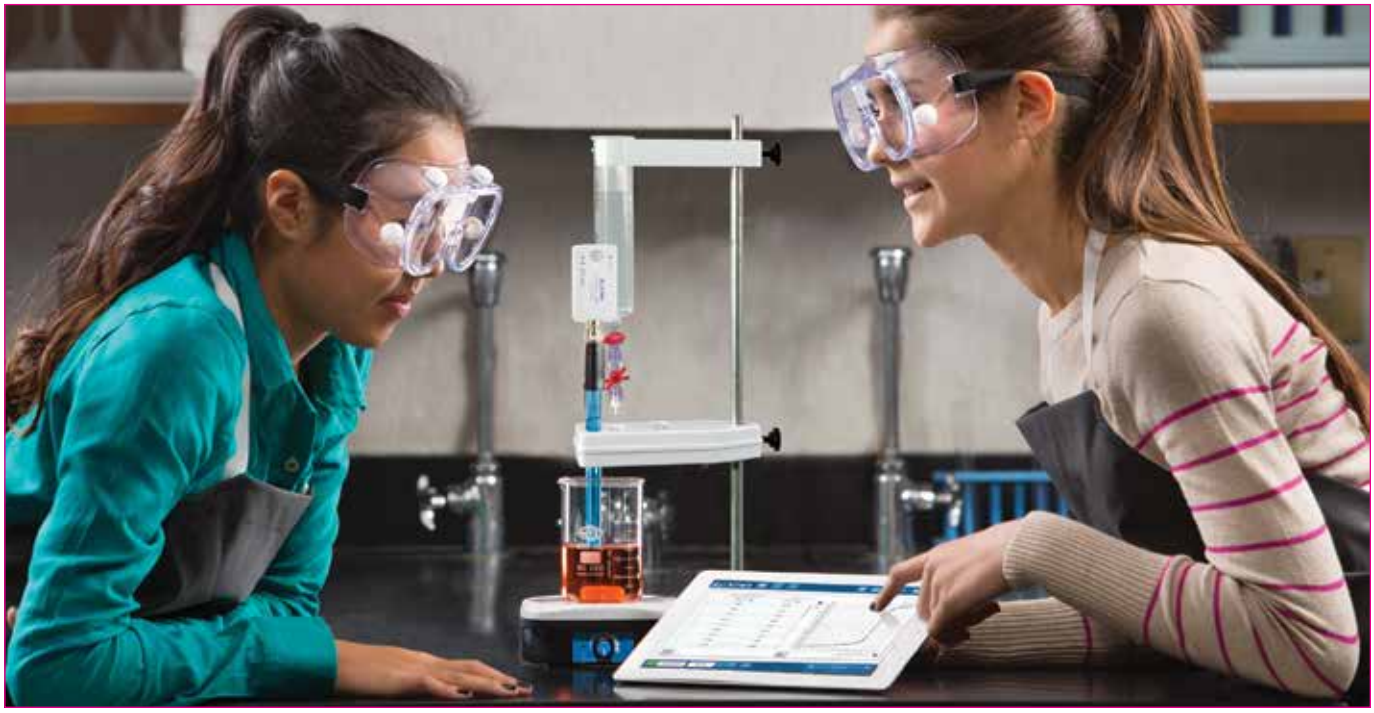
Collect measurements, compare pH levels of various solutions, and display data as a graph, digits display, table, and/or histogram.

Order Information

Wireless pH Sensor.....PS-3204

Wireless pH Sensor Pack PS-3331

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*



Wireless Drop Counter

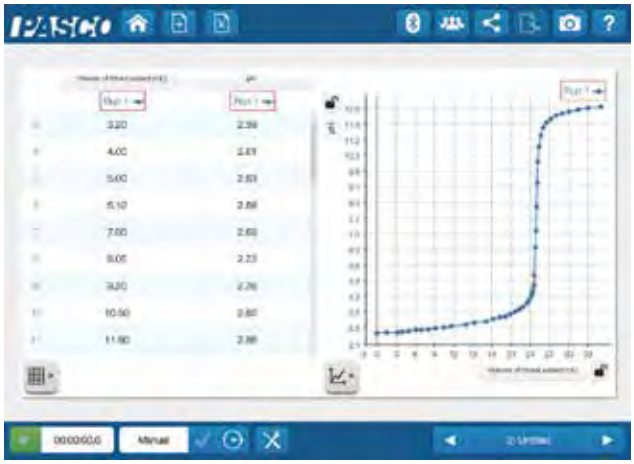
PS-3214

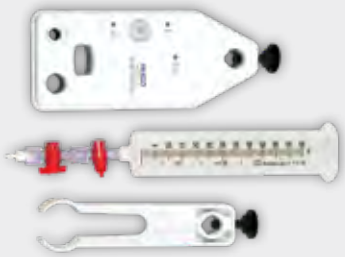
The Wireless Drop Counter has a wide (18 x 13 mm) drop window for better drop detection and easier alignment with burettes. It works equally well with large or small, fast or slow drops.

Measures up to 40 drops per second with drops as small as 0.5 mm.

Teaching Advantage:

- IR filter assures accurate counts because room lighting cannot affect results
- Sensor unit can suspend two other probes in solution, simplifying many experiments
- Wide drop window (18x13 mm) means better drop detection and easier alignment with burettes





Includes: Wireless Drop Counter, Stopcock Valves (2), 60 cc Drop Dispenser Syringe with Tip, and Syringe Holder. Included but not shown: Micro Stir Bar and Micro USB Cable (1 m).

Order Information

Wireless Drop Counter PS-3214

Wireless Temperature Sensor

PS-3201

Welcome to the modern thermometer. The Wireless Temperature Sensor transmits live data and allows students to continuously monitor, log, and plot temperature measurements on nearly any device. When lab-time ends but the experiment continues, students can set the sensor to log data autonomously for days, weeks, or months, then download it for analysis later. This durable, wireless sensor features a stainless steel probe for the most demanding of applications, as well as a battery that lasts over a year*. It can be used in a wide array of experiments and activities because it measures small, but significant temperature changes produced by chemical reactions, convection currents, and even skin temperatures.

Features:

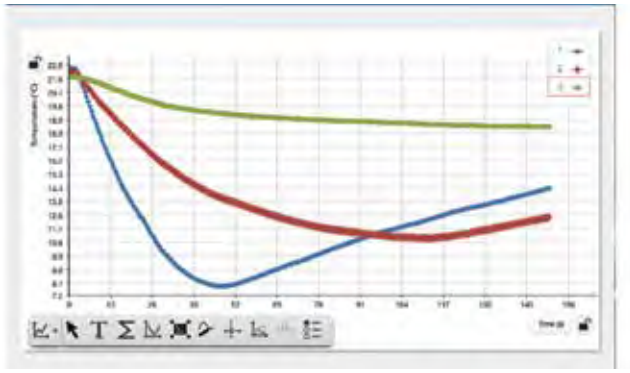
- Simply pair and go, no cables or adapters to manage
- Variable sampling rate for capturing small, fast changes or experiments that run for hours, days, or weeks
- Bluetooth® connectivity and long-lasting coin cell battery
- Logs temperature data directly onto the sensor for long-term experiments
- Dust, dirt, and sand-proof and water resistant (IP-X7 certified)

Order Information

Wireless Temperature Sensor.....PS-3201

Wireless Temperature Sensor Pack PS-3330

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*



Heats of evaporation indicate strength of intermolecular motion.

Heater Stirrer

PS-3401

This compact hot plate and stirrer has a white ceramic top that is ideal for heating and for seeing color changes when mixing solutions. It has been designed to withstand spills. Its safety features include warning labels and indicator LEDs. And the included rod makes it easy to support sensors.

Order Information

Heater Stirrer.....PS-3401

OHAUS Scout SKX Balance 220g

SE-8823A

The Ohaus Scout SKX digital electronic balances combine range, resolution, and low cost, making them ideal for use in teaching labs.

Simple two-button operation and visual menu prompts allow students to begin weighing with minimal instruction. The large, crisp display is easily viewed from any angle, so teachers can quickly check student results. A sealed front panel, molded spill ring, and removable stainless steel platforms provide protection from spills and make these balances easy to keep clean.

Use Ohaus SKX series electronic balances in conjunction with SPARKvue or PASCO Capstone software. Connect any SKX balance to a computer. via USB.

Order Information

OHAUS Scout SKX Balance 220g.....SE-8823A

Ohaus USB Adapter.....SE-8821

Wireless Temperature Sensor Link

PS-3222

The Wireless Temperature Sensor Link enables wireless connection for any PASCO temperature probe with a 3.5 mm connection. The link comes with a Fast Response Temperature Probe, but it can also connect to the Stainless Steel Temperature Probe, Skin/Surface Temperature Probe, the Absolute Zero Sphere, and the Ideal Gas Law Apparatus.

Order Information

Wireless Temperature Sensor Link.....PS-3222

Absolute Zero Sphere

TD-8595

The Absolute Zero Sphere is an effective tool for determining absolute zero temperature. Students connect Pressure and Temperature Sensors before immersing the sphere in water baths of varying temperatures. As the pressure and temperature change, a live graph is generated in PASCO Capstone™. Once the data is collected, students can use a linear fit to extrapolate the value of absolute zero.

Ideal Gas Law Apparatus

TD-8596A

Investigating the Ideal Gas Law is simple using PASCO's Ideal Gas Law Apparatus. By connecting a Pressure Sensor and a Temperature Sensor to the syringe, students can quantitatively look at the relationships between pressure, temperature, and volume.

Includes Ideal Gas Law Syringe, built-in fast response thermistor, with male leur connector. A Wireless Pressure Sensor (PS-3203) and Wireless Temperature Link (PS-3222) are required for data collection.

Includes built-in fast response thermistor, with male leur connector. For data collection a Wireless Pressure Sensor (PS-3203) and Wireless Temperature Link (PS-3222) are required.

Absolute Zero Sphere Connector

Order Information

Ideal Gas Law Apparatus TD-8596A

Order Information

Absolute Zero Sphere.....TD-8595

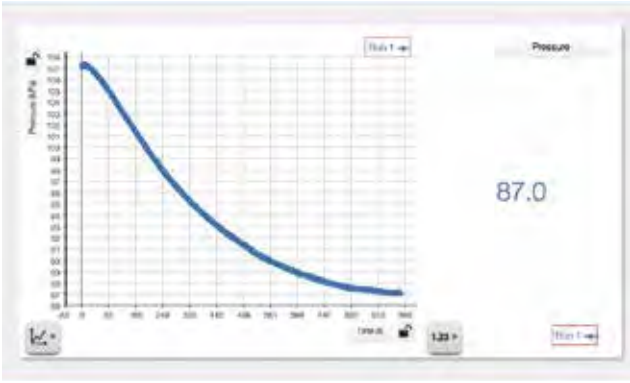
Wireless Pressure Sensor

PS-3203

The Wireless Pressure Sensor allows students to easily collect accurate gas pressure data for a wide range of applications. Included is a 60cc syringe, tubing, and connectors that facilitate experiments such as Boyle's Law and measuring pinch-grip strength. Within PASCO's software, students can easily select their desired units from a list containing kPa, mmHg, inHg, mbar, psi, atm, and torr.

Features:

- Measures pressure even when the pressure within the system drops below ambient pressure
- Supports common units (kPa, atm, psi, mmHg, or N/m^2) for many applications
- Bluetooth® wireless connectivity and long-lasting rechargeable battery



Order Information

Wireless Pressure Sensor PS-3203

Wireless Pressure Sensor Pack.....PS-3333

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Conductivity Sensor

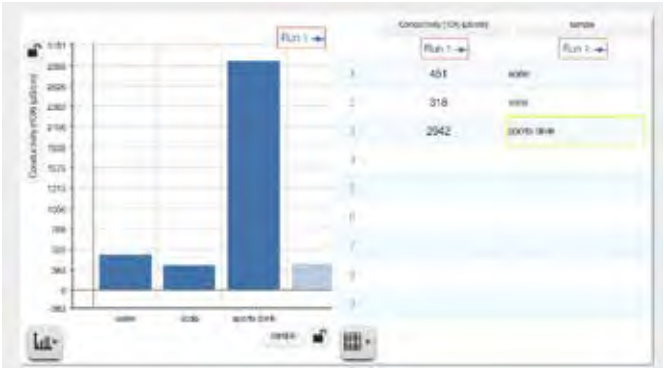
PS-3210A

The Wireless Conductivity Sensor measures the electrical conductivity of an aqueous solution. It is ideal for investigating the properties of solutions, including total dissolved solids (TDS) for water quality inquiry. Because it is temperature compensated, calibrations are less frequent and can be applied across a range of temperatures. With an improved range of 0 to 40,000 µS/cm, this sensor can be utilized for chemical, biological, and environmental studies.

Teacher tip: To measure brackish or marine samples, perform a dilution until the measurement falls within the range, then multiply to determine sample conductivity.

Features:

- Measure conductivity and total dissolved solids
- Automatic temperature compensation
- Battery life >1 year
- Remote logging with built-in memory
- Dust-proof, sand-proof, and water-resistant (1 meter for 30 minutes)



Order Information

Wireless Conductivity Sensor PS-3210A

Wireless Conductivity Sensor Pack.....PS-3332

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Voltage Sensor

PS-3211

The Wireless Voltage Sensor helps chemistry students investigate redox reactions, electrolytic cell potentials, and the impact solution strength on these generated potentials. By testing potential differences between two half reactions, separated by a salt bridge, students can begin to understand the driving forces behind modern batteries.

Features:

- **Two Ranges:** ±15 V, ±5 V
- **Resolution:** 7 mV (±15 V range); 2 mV (±5 V range)
- Bluetooth® sampling rate of 1 kHz
- Higher speed sampling via USB
- Remote logging

Order Information

Wireless Voltage Sensor.....PS-3211

Wireless Voltage Sensor Pack PS-3335

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

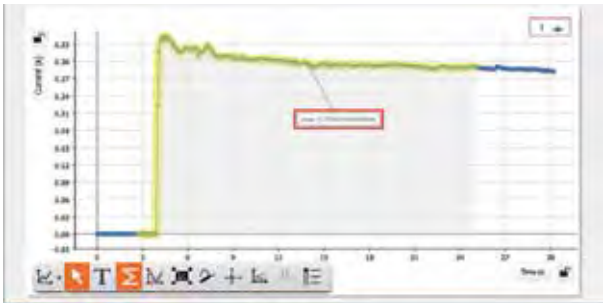
Wireless Current Sensor

PS-3212

Current sensors enable chemistry students to count the electrons involved in driving reactions, much like how a scale accounts for mass in reactions. Amperage determines how many atoms are involved in a chemical reaction. Since the two are related, current can be used to find out how much reactant is available in a solution. Integrating currents keeps track of how much metal might electroplate onto an electrode.

Features:

- **Two Ranges:** ±1.0 A and ±0.1 A
- **Resolution:** 0.2 mA at ±1 A range and 0.02 mA at ±0.1 A range
- Bluetooth® sampling rate of 1.0 kHz
- Higher speed sampling via USB
- Remote logging
- Variable sampling rate for recording small, fast changes or experiments that run for hours, days, or weeks



Order Information

Wireless Current Sensor PS-3212

Wireless Current Sensor Pack.....PS-3336

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Molecular Model Set

PS-3400

The Molecular Model Set is the perfect tool to help students understand core science concepts such as chemical formulas, equation balancing and the conservation of mass. They are critical to making more advanced concepts easier to visualize and allow students to predict polarity and study reaction mechanisms. Students can explore intermolecular attractions, steric hindrances, nomenclature and complex structure. Anything is possible for students, from creating simple water or carbon dioxide molecules to complex biochemicals such as amino acids and lipids. The set is ideal for studying Chemistry and Biochemistry.

Order Information

Molecular Model Set.....PS-3400

Wireless Geiger Counter

PS-3238

The PASCO Wireless Geiger Counter counts beta, gamma and alpha radiation particles as they enter the Geiger–Müller detector tube inside the counter. Designed for easy mounting, the Geiger Counter provides superior position control in inverse square law labs, as well as an audible beep to indicate the detection of ionizing radiation. The front plastic snout fits conveniently inside the NU-3344 Sample Holder stand (available separately), which stabilizes the front of the counter's detector tube exactly 1 cm from the first slot in the holder.

With the Wireless Geiger Counter, students can wirelessly control the high voltage supplied to the Geiger–Müller tube inside the counter, enabling them to make measurements of counts/interval for different tube voltages. They can also plot counts/interval versus tube voltages to experimentally observe the Geiger plateau characteristics of the tube.

Features:

- Built-in metal mesh screen to protect the delicate mica window in the front of the Geiger–Müller detector tube
- Audible beep count indication that is easily switched on or off
- **Versatile positioning options:** either in the NU-3344 Sample Holder, hand-held, or mounted on a rod stand
- Convenient design to natively fit the PASCO NU-3344 Sample Holder
- Provides wireless control over the high voltage supplied to the Geiger–Müller tube inside the counter for Geiger plateau experiments

Includes:

- Wireless Geiger Counter
- Micro USB Cable: PS-3584
- Threaded handle for mounting the sensor to a ring stand

Order Information

Wireless Geiger Counter.....PS-3238

Geiger Counter Sample Holder.....NU-3344

Wireless Polarimeter

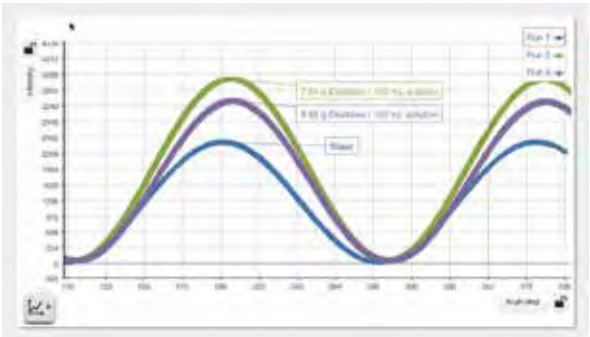
PS-3237

The Wireless Polarimeter has both Bluetooth® and USB connectivity, making it possible to analyze chiral compounds with your iPad®, Chromebook™, Android tablet, or computer. It is ideal for introductory experiments in organic chemistry and biochemistry, where chiral compounds are of special interest.

PASCO's Wireless Polarimeter passes plane polarized light through a vertical sample, which contains a chiral compound, followed by an analyzer and detector. The optical rotation is determined by finding the angle between the starting position and the location where the optimum light level transmits through the cross polarizer. Students can use the rotation data to calculate the concentration of a chiral sample, while the specific rotation (amount turned per g/ml dissolved) is an intrinsic property that can be used to differentiate molecules or determine racemic mixtures.

Specifications:

- **Connectivity:** Bluetooth and USB
- **LED light source:** 589 nm
- **Optical Rotation Accuracy:** ±0.09°
- **Cell Length:** 101.3mm ± 0.8mm



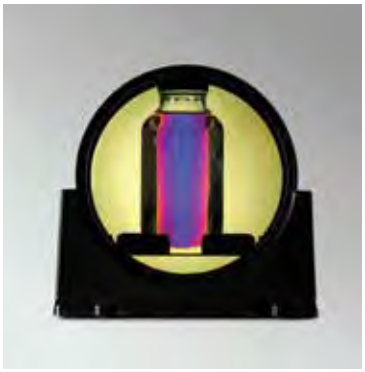
Order Information

Wireless Polarimeter.....PS-3237

Polarizer Demonstrator

OS-9477A

Confirm Malus' Law using the Polarizer Demonstrator and a Light Sensor. The angle is read directly from the polarizer, which is marked in 5° increments. Any light source can be used, but the experiment works especially well with the PASCO Color Mixer (OS-8496). See pasco.com for more information.



Introduce the concept of polarization with this colorful and meaningful demonstration.

Order Information

Polarizer Demonstrator.....OS-9477A

Wireless Colorimeter & Turbidity Sensor

PS-3215

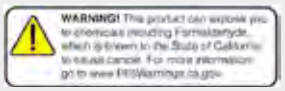
The Wireless Colorimeter & Turbidity Sensor simultaneously measures the absorbance and transmittance of six different wavelengths. The sensor can be used to study Beer's Law (absorbance vs. concentration), enzyme activity, photosynthesis, and the rates of chemical reactions (absorbance vs. time). After a simple calibration, students can quickly begin viewing live measurements as they materialize across the visible spectrum at 650 nm (red), 600 nm (orange), 570 nm (yellow), 550 nm (green), 500 nm (blue), and 450 nm (violet).

This sensor also functions as a high-quality turbidimeter for water quality analysis. Rather than simply measuring transmitted light, the Wireless Colorimeter and Turbidity Sensor measures light scattered at a 90 degree angle from the sample, resulting in accurate and repeatable measurements. Additionally, the internal housing for the cuvette is opaque, which limits ambient light interference to preserve accuracy.

Features:

- Stabilized light source for consistent readings
- Measures six different wavelengths simultaneously
- PASCO software displays the absorbance & transmittance at each wavelength in the appropriate color
- Directly calibrated to read ezSample concentrations of Ammonia, Nitrate, Phosphate, Iron and Chlorine in ppm.
- Functions as both a colorimeter and turbidimeter

Includes: USB charging cable, 9 cuvettes, 2 cuvette racks, and one 100 NTU calibration cuvette.

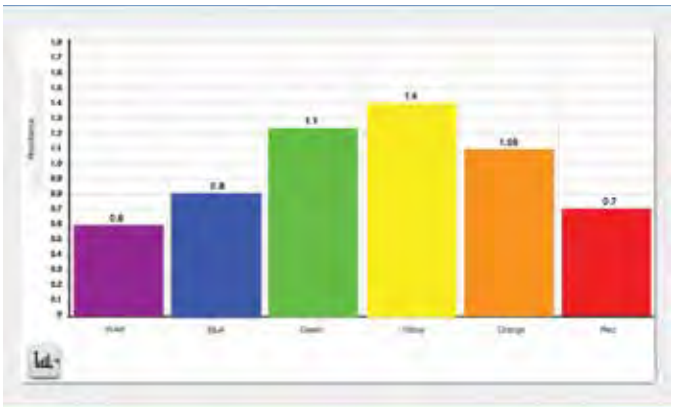


Order Information

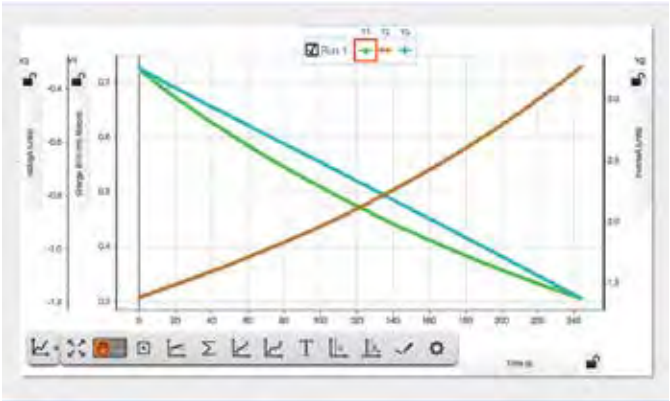
Wireless Colorimeter & Turbidity Sensor.....PS-3215

Wireless Colorimeter & Turbidity Sensor Pack PS-3334

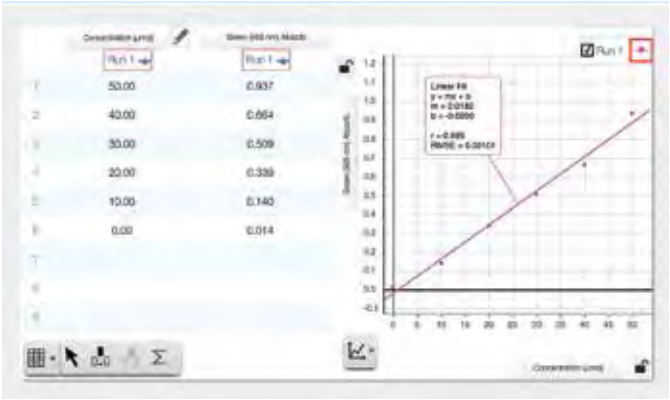
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*



Measure the absorbance and transmittance of a solution at six different wavelengths simultaneously!



Graphically visualize how a reaction changes over time. Use SPARKvue to visualize multiple measurements on the same graph.



Cuvettes and Caps

SE-8739

Set of 100 identical 3.5-mL polystyrene cuvettes and caps. Transparent to visible light.

Order Information

Cuvettes and Caps.....SE-8739

Wireless Spectrometer (VIS)

PS-2600A

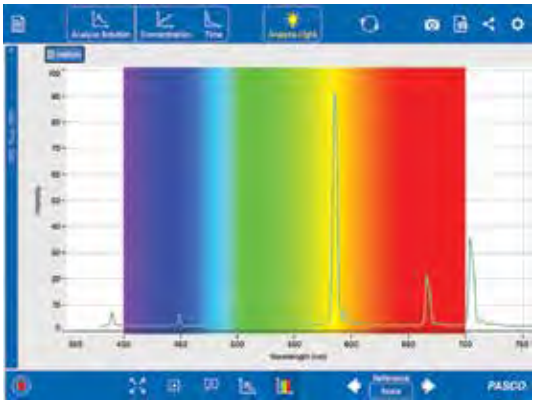
The award-winning PASCO Wireless Spectrometer is specifically designed for modern chemistry, biology, and physics labs. It connects to student devices via USB or Bluetooth Low Energy and includes free Spectrometry software with built-in tools for spectral analysis. Scan times are fast, enabling students to collect a full spectrum of data in less than a second. Plots are provided for common applications, including Absorbance vs. Wavelength (or Intensity vs. Wavelength), Absorbance vs. Concentration (Beer's law), and Absorbance vs. Time.

Perform these labs with the PASCO Wireless Spectrometer:

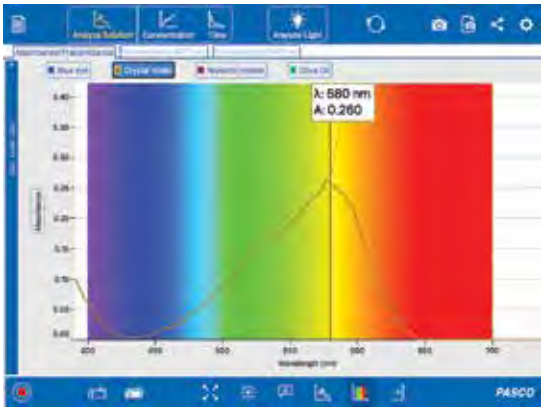
- Emission Spectra of Light
- Absorbance Spectra
- Beer's Law
- Kinetics
- Fluorescence

Order Information

Wireless Spectrometer (Vis) PS-2600A
Includes USB charging cable, 10 cuvettes, and Spectrometry Software.



Analyze light sources with the optional Fiber Optic Cable. Easily compare the spectrum to known reference lines in the software.



Full visible spectrum includes a large digits display that helps students select wavelengths and determine absorbance values.

Instrument Comparison Guide

Compare features and capabilities to find the right instrument for your lab.

Colorimeter & Turbidity
PS-3215

Wireless Spectrometer
PS-2600A

PASCO UV-Vis Spectrometer
SE-3607

Feature	Colorimeter & Turbidity	Wireless Spectrometer	UV-Vis Spectrometer
Light Source	White LED	RGB LED-Boosted Tungsten	Deuterium (UV) Tungsten (Vis)
Optical Resolution	±25 nm	2 nm	1 nm
Wavelength Range	450, 500, 550, 570, 600, 650 nm	390 – 950 nm	180 – 1050 nm
Wavelength Accuracy	NA	≤6 nm	1 nm
Photometric Range (for best accuracy)	0.05 to 1.5	0.1 to 1.4	0.1 to 1.0
Photometric Accuracy	±5%	±10%	±5%
Full Spectrum Scans	No	Yes	Yes
Scan Time	N/A	1 ms – 25 s	4 ms – 10 s
Connects via USB	Yes	Yes	Yes
Connects via Bluetooth	Yes	Yes	No
Rechargeable battery (for cordless operation only)	Yes	Yes	No
Fluorescent Excitation	No	405, 500 nm	No
Works with SPARKvue & Capstone Software	Yes	No	No
Works with PASCO Spectrometry Software	No	Yes	Yes
Data Storage/Onboard Memory	Yes	No	No
Good for Field Use	Yes	Yes	N/A
Turbidimeter	Yes	No	No

UV-Vis Spectrometer

SE-3607

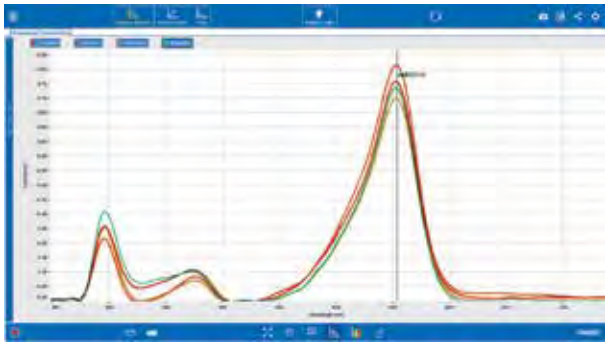
The SE-3607 is an easy-to-use, wide range UV-Vis spectrometer that delivers fast, accurate and reliable performance for routine analyses in chemistry and biochemistry teaching labs. With USB connectivity and cross-platform Spectrometry Software, the PASCO UV-Vis Spectrometer improves collaboration between lab members, enabling data collected on a computer or laptop to be analyzed on tablets, iPads, and Chromebooks. Additional accessories, such as the UV-Vis Fiber Optic Kit, can be used to extend the spectrometer's capabilities for the analysis of emission spectra, light sources, and the classification of lasers.

Highlights:

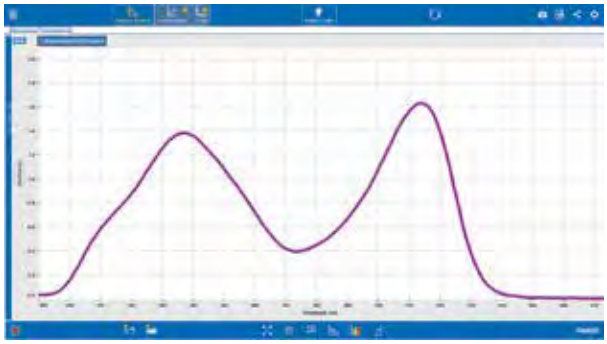
- Spectral scans from 180 to 1050 nm
- Award-winning Spectrometry software
- One-click light and dark calibrations
- Fast warm-up time (<10 minutes)
- Adjustable scan averaging, signal integration time and smoothing
- Graphs Absorbance vs. Wavelength
- Graphs Intensity vs. Wavelength (emission spectra)
- Graphs Absorbance vs. Concentration (Beer's Law)
- Graphs Absorption vs. Time (kinetics)

Applications:

- Determination of solution concentrations
- Identification of unknown substances
- Measurement of reaction rates or rate of decay
- Colorimetric assays (e.g., BCA, Bradford, Lowry)
- Purity testing of synthesized compounds
- Determination of the equilibrium constant
- Determination of molar absorption coefficients
- Quality testing (e.g., fermentation mediums, food adulteration, QA levels)



Absorbance of solutions containing various amounts of NaOH.



Absorbance of Aspirin.

Semi-Micro Volume Cuvettes (Qty. 10), Cuvette Rack (EC-3590), USB-A to USB-B Cable, External AC Adapter, 24 V Power Supply, Foam Lined Carrying Case (ABS).

Quartz Cuvettes Sold Separately

Fiber Optic Kit Sold Separately

Download on the App Store

GET IT ON Google Play

For Mac® and Windows® Computers go to pasco.com/downloads

Order Information

UV-Vis Spectrometer.....SE-3607

UV-Vis Fiber Optic Kit.....SE-7182

UV Quartz Cuvettes (Qty. 2).....SE-3611

Disposable UV Semi-Micro Volume Cuvettes (Qty. 10).....SE-3610

Melting Point Apparatus

NEW

PS-3239

Melt point range is an important factor for determining the identity and purity of compounds, which is primary focus of many college chemistry labs. The built-in magnifying eyepiece allows students to observe the melting process individually, or a USB camera can be mounted to record the process to view in real time on a screen for larger groups.

The variable ramp rates allow you to quickly raise the sample temperature near melting (to preserve lab time) before slowing the rate down again, and the hold temp command ensures all substances reach a uniform temperature. Check the current temperature easily with the built-in temperature sensor, and use the cooling fan between measurements to restore the heating block to room temperature fast.

Melting Point Apparatus Eyepiece Camera

SE-6215

Short focal length digital eyepiece camera to capture the melting process. Image stacks will be time coded to compare to temperature data from the Melting Point Apparatus. Images can be scheduled to be captured every 5 seconds during the heating curve for more accurate determination of substances melting points.

Order Information

Melting Point Apparatus.....PS-3239
Melting Point Apparatus Eyepiece Camera SE-6215

pH Buffer Capsule Kit

SC-2321

This set of capsules can be used to create a quick and reliable preparation of fresh solutions of known pH values for calibrating the PASPORT pH Sensor (such as PS-2102 and other pH sensors)

Contains one vial each, with 10 capsules per vial of pH 4.0, pH 7.0, and pH 10.0. Each capsule is sufficient to make 100 mL buffer solution. Includes preservative solution which contains a pH indicator and colors each buffer solution for easy identification.

Using distilled water, the user can formulate clear solutions accurate to ±0.02 pH unit. The dry powder remains stable.

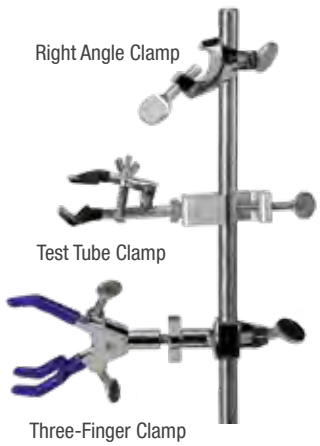
Standard buffer capsule kit. pH of 4, 7 and 10.

Order Information

pH Buffer Capsule Kit.....SC-2321

Round Base with Rod and Clamps

Round Base with Rod



Right Angle Clamp

Test Tube Clamp

Three-Finger Clamp

Order Information

Round Base with Rod.....ME-8270
Three-Finger Clamp.....SE-9445
Right Angle Clamp.....SE-9444
Test Tube-Utility Clamp.....SE-9446

Flat pH Probe

PS-3514

The Flat pH Probe gives you the freedom to measure what you want, where you want. Study pH levels in different kinds of foods, investigate the pH of common skin and hair care products, and easily collect pH data when doing soil analysis. Can be used on semi-solids by pressing the probe against a moist surface. This product is intended for use with the Wireless pH Sensor.

Oxidation Reduction Potential Probe

PS-3515

This probe connects to the Wireless pH Sensor and measures the potential of a solution to be oxidized or reduced in comparison to a silver/silver chloride reference cell. This allows students to determine the ability of a species in a solution to act as an oxidizing agent or reducing agent during redox reactions.

Oxidation Reduction Potential Probe and 2m cable

Ion Selective Electrodes

PASCO's collection of ISEs all connect to the Wireless pH Sensor and allows students to measure the concentration of various ions in an aqueous solutions. All of the electrodes include a (BNC) extension cable.

Ammonium Ion

Carbon Dioxide Ion

Calcium Ion

Chloride Ion

Potassium Ion

Nitrate Ion

Order Information

Flat pH Probe.....PS-3514
Oxidation Reduction Potential Probe.....PS-3515

Ion Selective Electrodes

Ammonium Ion Selective Electrode.....PS-3516
Carbon Dioxide Ion Selective Electrode.....PS-3517
Calcium Ion Selective Electrode.....PS-3518
Chloride Ion Selective Electrode.....PS-3519
Potassium Ion Selective Electrode.....PS-3520
Nitrate Ion Selective Electrode.....PS-3521

NOTE: All probes and electrodes (listed above) are designed for use with the Wireless pH Sensor (PS-3204)

Environmental Science

Solutions for General, Advanced, and AG courses

Integrated Solutions for Environmental Science

Facilitate student investigations of environmental topics anytime, anywhere with PASCO. We offer cutting-edge solutions for both general and advanced environmental science courses, as well as agricultural science courses. Using our award-winning Wireless Sensors and cross-platform software, students can collect and visualize live data, analyze lab results, and log measurements for long-term studies. Pair them with our standards-aligned labs to investigate countless environmental concepts, both inside and outside the classroom.

Environmental Science Index

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Lab Stations....75
CO_2, Soil Moisture....76
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World Class Support and Professional Development - Committed to Your Success!

We want you to have all the support, guidance, and training you need. Just let us know how we can help.

AG Science Starter Lab Station

EB-6336

The Agricultural Science Starter Lab Station makes it both easy and affordable to begin using sensor-based technology with your environmental or agricultural science students. Complete with wireless sensors, ten student labs, and a storage case, the Starter Lab Station lets students investigate environmental concepts such as soil quality, water treatment, and the energy content of food. Add the Agricultural Science Extension Lab Station to perform all ten of the included student labs, plus dozens of hands-on activities from the PASCO Experiment Library.

AG Science Station Lab Titles

The AG Science Starter Lab Station supports 7 of the 10 labs. Add the Extension Lab Station* to do all 10 lab titles.

Determining Soil Quality	**Plant Pigments & Photosynthesis**
Water Treatment	**Plant Respiration & Photosynthesis**
Freshwater Quality Monitoring*	Modeling an Ecosystem*
Respiration of Germinating Seeds	Greenhouse Gases*
	Energy Content of Food
	Diffusion

Shown here: AG Science Starter Lab Station

The AG Science Starter Lab Station includes a lab manual and these wireless sensors and apparatus:

- Temperature
- pH
- CO_2
- Conductivity
- Colorimeter & Turbidity
- Storage Case

**To do the remaining 3 labs from the AG Science Lab Manual (listed above), add the Extension Lab Station (see page 73). Add the AG Science Teacher Lab Manual to perform an additional 4 AG science labs.*

Order Information

Agricultural Science Starter Lab Station.....EB-6336

AG Science Lab Manual

Available online, PASCO's Agricultural Science Lab Manual includes twelve student investigations that cover a variety of environmental topics. Each investigation comes classroom-ready with an editable student lab handout, sample data, and teacher answer key. To download labs and view standards-alignment details, visit the PASCO Experiment Library online.

- Determining Soil Quality
- Water Treatment
- Freshwater Quality Monitoring
- Water and pH
- Respiration of Germinating Seeds
- Plant Pigments and Photosynthesis
- Plant Respiration and Photosynthesis
- Modeling an Ecosystem
- Greenhouse Gases
- Energy Content of Food
- Diffusion
- Soil and pH

Advanced Environmental Science Through Inquiry Labs for AP® & IB®

PASCO's Advanced Environmental Science Through Inquiry Teacher Lab Manual contains 22 labs that have been specifically designed to support student inquiry, as well as AP® and IB® curriculum*. This manual is available in both a print version and an all-digital version.

- Most labs can be completed in one lab session with readily available materials, including the sensor bundles on the opposite page.
- Easy and meaningful data collection leads to increased time for data analysis and open inquiry.
- Includes sample data for investigations and inquiry, answers to analysis and synthesis questions, an assessment rubric, teacher tips, lab preparation information, and more.
- Labs integrate high-order analysis and synthesis questions.
- The flexible format provides guided inquiry opportunities and scaffolding, so students can create their own experiments.

Note: The included labs offer a variety of structured, guided and open inquiry approaches, allowing students to explore both traditional and self-selected environmental concepts.

Advanced Environmental Science Lab Experiments	Starter Bundle (PS-7616B)	Starter and Extension Bundles (PS-7616B, PS-7617C)	IB® Standards*	Targeted AP® Learning Objectives*
1. Determining Soil Quality		●	5.1; 5.2; 5.3	ERT–4.B; 4.C
2. Insolation and the Seasons	●	●	1.2	ENG–2.A
3. Investigating Specific Heat	●	●	1.2; 2.3	ENG–2.A
4. Monitoring Microclimates	●	●	7.1; 7.2; 7.3	ENG–2.B; ERT–4.E
5. Sunlight Intensity and Reflectivity	●	●	2.3; 7.1-7.3	ENG–2.A
6. Tracking Weather	●	●	7.2; 7.3	ERT–4.E; ENG–2.B
7. Earth's Magnetic Field	●	●	1.2	ERT–4.A
8. Radiation Energy Transfer	●	●	1.2; 2.3	ENG–3.J
9. Seafloor Spreading & Plate Tectonics**	●	●	1.2	ERT–4.A
10. Modeling an Ecosystem		●	1.2; 2.4; 2.5; 3.1	ENT–1.B–1.G; ENG–1.C
11. Photosynthesis and Primary Productivity		●	1.1; 1.2; 2.3; 5.2	ENG–1.A; ERT–1.C; 1.D
12. Photosynthesis and Cell Respiration		●	1.1; 1.2; 2.3; 5.2	ENG–1.B
13. Cellular Respiration and Carbon Cycle		●	1.1; 1.2; 6.1; 6.2	ENG–1.B
14. Energy Content of Food	●	●	1.3; 2.3	ENG–1.B
15. Weather in a Terrarium	●	●	1.1; 1.2; 7.2; 7.3	ERT–4.E
16. Yeast Respiration		●	1.1; 1.2	ENG–3.I
17. Properties of Water	●	●	4.1; 4.2	STB–3.N
18. Air Pollution and Acid Rain	●	●	6.1; 6.2; 6.3; 6.4	STB–2.H
19. Monitoring Water Quality		●	4.1; 4.2; 4.4	STB–3.E
20. Toxicology Using Yeast	●	●	1.1; 1.2	EIN–3.A
21. Water Treatment		●	4.1; 4.2; 4.4	STB–3.N
22. Greenhouse Gases	●	●	6.1; 6.2; 6.3; 6.4	STB–4.E

* IB is a registered trademark of the International Baccalaureate Organization, which was not involved in the production of, and does not endorse, this product.
AP is a trademark registered and/or owned by the College Board, which was not involved in the production of, and does not endorse, this product.

**Requires Wireless 3-Axis Magnetic Field Sensor; see opposite page.

AG Science Lab Stations Support Advanced Environmental Science Investigations

Together, the Agricultural Starter and Extension Lab Stations offer a lab-ready solution for exploring essential topics in agricultural and environmental science. When paired with PASCO's Advanced Environmental Science Through Inquiry Lab Manual, students can perform more than 20 sensor-based experiments, complete with hands-on data collection, visualization, and analysis. Add the Water Quality Field Guide to extend your investigations even further.

AG Science Station Lab Titles

Together, the AG Science Starter and Extension Lab Stations support over 20 Advanced Environmental labs. Conduct the 10 labs below right out of the box.

1. Determining Soil Quality
2. Water Treatment
3. Freshwater Quality Monitoring
4. Respiration of Germinating Seeds
5. Plant Pigments & Photosynthesis
6. Plant Respiration & Photosynthesis
7. Modeling an Ecosystem
8. Greenhouse Gases
9. Energy Content of Food
10. Diffusion

Shown here: AG Science Starter and Extension Lab Stations

The AG Science Starter & Extension Lab Stations include these wireless sensors and materials:

- Temperature
- Conductivity
- pH
- CO_2
- Colorimeter Turbidity
- Optical Dissolved Oxygen
- Weather with GPS
- EcoZone System
- Lab Manual
- Storage Case

Water Quality Field Guide

PS-2829A

The Water Quality Field Guide is a combination 'how-to' and 'why?' reference. It covers how to successfully measure water quality in the field, why these measurements are important, and what they mean.

Wireless Magnetic Field Sensor

PS-3221

This 3-Axis Magnetic Field Sensor can sense the Earth's magnetic field, as well as fields from coils and bar magnets. There are two ranges: ±50 gauss and ±1300 gauss. This sensor is primarily for static fields.

Order Information

Advanced Environmental and Earth Sciences Teacher Guide PS-2979
Agricultural Science Starter Lab Station EB-6336
Agricultural Science Extension Lab Station..... EB-6337
Water Quality Field Guide..... PS-2829A
Wireless Magnetic Field Sensor PS-3221

CO_2 Sensor shown in use with Dissolved CO_2 Waterproof Sleeve.

Wireless CO_2 Sensor

PS-3208

Measure changes in carbon dioxide (CO_2) gas levels quickly and easily with the Wireless CO_2 Sensor. This temperature-compensated sensor can operate in high humidity environments, such as the included 250-mL sample bottle, and employs live data to make core labs such as photosynthesis, cellular respiration, and metabolism experiments engaging and impactful. With the ability to store more than 55,000 data points, the sensor also supports long-term studies of carbon cycling that span the course of a single night or an entire weekend.

Features:

- Logging ability for long-term experiments, store up to 55,000 data points
- Integrated stopper for use with sample bottle and common glassware
- Temperature compensated for accurate results

The sleeves are waterproof but allow CO_2 gas to pass through the membrane, creating a headspace around the sensor.

Order Information

Wireless CO_2 Sensor (Carbon Dioxide) PS-3208

Wireless CO_2 Sensor Pack PS-3341

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Dissolved CO_2 Waterproof Sleeve.....PS-3545

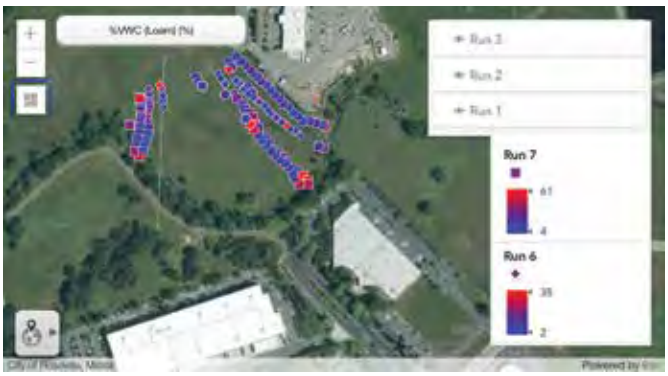
Wireless Soil Moisture Sensor

PS-3228

The Wireless Soil Moisture Sensor measures the volumetric water content (%VWC) of soil, reporting data in real time or storing it onboard the sensor's memory for long-term experiments. Durable and easy to use, the Wireless Soil Moisture Sensor is the perfect tool for monitoring controlled experiments in the classroom and long-term experiments outdoors. From experiments in evaporation and soil composition to water consumption and plant competition, the Wireless Soil Moisture Sensor makes it easy for students to investigate a wide array of topics through real-time or long-term data collection.

Features:

- Collect and display data in real time within PASCO Capstone or SPARKvue software
- Automate data collection for hours, days, or weeks with Logging Mode
- Bluetooth connectivity enables use in the classroom, lab, or field
- Supports use of GPS data from a mobile device for GIS mapping activities
- Selectable calibrations for predominantly sandy soils, clay soils, and loamy soils



Order Information

Wireless Soil Moisture Sensor.....PS-3228

Wireless Weather Sensor with GPS

PS-3209

The Wireless Weather Sensor is an all-in-one instrument for monitoring complex environmental conditions. It houses several sensing elements within a single unit to provide 19 different measurements. Use the sensor in logging mode with the Weather Vane Accessory for long-term monitoring, or use it as a handheld instrument to study microclimates and local weather patterns. The collected data can be wirelessly exported to most devices, including classroom device dashboards, making it easier to support group activities that are constrained by time. Plus, with the built-in GPS, students can collect and analyze location data using the SPARKvue map display, powered by ESRI ArcGIS.

Features:

- Logging mode for long-term experiments
- Water resistant for extended environmental monitoring
- Built-in light sensor measures light level and UV index
- SPARKvue map display supports spatial analysis (GIS)
- 19 different measurements can be collected and analyzed individually or simultaneously
- GPS enables data from any PASCO probe to be viewed on a map, when connected

esri Partner Network

Visualize your data in seconds with a FREE ESRI's ArcGIS account!

Measurements

Weather

1. Ambient Temperature
2. Barometric Pressure
3. Wind Speed
4. Wind Direction (true)
5. Relative Humidity
6. Absolute Humidity
7. Dew Point
8. Wind Chill
9. Heat Stress Index

Light

10. Ambient Light (lux)
11. UV Index
12. PAR
13. Irradiance

GPS

14. Latitude
15. Longitude
16. Altitude
17. Speed
18. Magnetic Direction
19. True Direction

The weather dashboard displays data from the multiple sensors.

Weather Vane Accessory sold separately.

Order Information

Wireless Weather Sensor with GPS PS-3209

Wireless Weather Sensor with GPS Pack.....PS-3340

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Weather Vane Accessory.....PS-3553

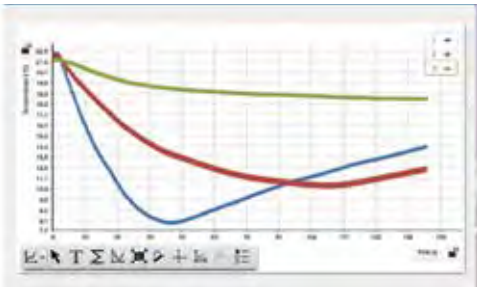
Wireless Temperature Sensor

PS-3201

Welcome to the modern thermometer. The Wireless Temperature Sensor transmits live data and allows students to continuously monitor, log, and plot temperature measurements on nearly any device. When lab-time ends but the experiment continues, students can set the sensor to log data autonomously for days, weeks, or months, then download it for analysis later. This durable, wireless sensor features a stainless steel probe for the most demanding of applications, as well as a battery that lasts over a year*. It can be used in a wide array of experiments and activities because it measures small, but significant temperature changes produced by chemical reactions, convection currents, and even skin temperatures.

Features:

- Simply pair and go, no cables or adapters to manage
- Variable sampling rate for capturing small, fast changes or experiments that run for hours, days, or weeks
- Bluetooth® connectivity and long-lasting coin cell battery
- Logs temperature data directly onto the sensor for long-term experiments
- Dust, dirt, and sand-proof and water resistant (IP-X7 certified)



Order Information

Wireless Temperature Sensor.....PS-3201

Wireless Temperature Sensor Pack PS-3330

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless pH Sensor

PS-3204

The Wireless pH Sensor is a must-have for any chemistry, biology, or environmental science course. Equally capable in the lab or field, the sensor eliminates the hassle of cables, reducing spills and improving safety. Plus, it rarely requires charging; the sensor's coin cell battery lasts for 2-3 years in most labs and costs about one dollar to replace. It can transmit data in real time, or store data for days when continuous monitoring is required. The Wireless pH Sensor enhances countless activities, including acid-base titrations, investigations into household chemicals, analyses of chemical reactions, water quality studies, and much more.

Features:

- Simply pair and go, no cables or interfaces to manage
- Compatible with ion-selective electrodes (ISE) and the oxidation reduction probe (ORP)
- Bluetooth® connectivity and a long-lasting coin cell battery
- Logs pH data directly onto the sensor for long-term experiments
- Wirelessly connects to SPARKvue and Capstone for intuitive analysis and lab reports

Measure the pH of water in different locations and annotate with text and pictures.

Order Information

Wireless pH Sensor.....PS-3204

Wireless pH Sensor Pack PS-3331

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Conductivity Sensor

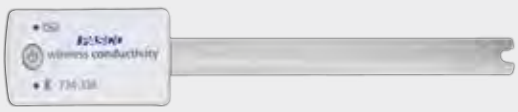
PS-3210A

The Wireless Conductivity Sensor measures the electrical conductivity of an aqueous solution. It is ideal for investigating the properties of solutions, including total dissolved solids (TDS) for water quality inquiry. Because it is temperature compensated, calibrations are less frequent and can be applied across a range of temperatures. With an improved range of 0 to 40,000 µS/cm, this sensor can be utilized for chemical, biological, and environmental studies.

Teacher tip: To measure brackish or marine samples, perform a dilution until the measurement falls within the range, then multiply by that factor to determine sample conductivity.

Features:

- Measure conductivity and total dissolved solids
- Automatic temperature compensation
- Battery life >1 year
- Remote logging with built-in memory
- Dust-proof, sand-proof, and water-resistant (1 meter for 30 minutes)



Order Information

Wireless Conductivity Sensor.....PS-3210A

Wireless Conductivity Sensor Pack.....PS-3332

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

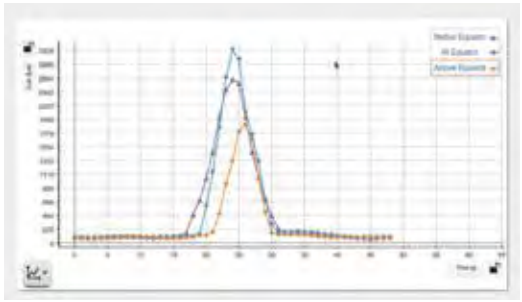
Wireless Light and Color Sensor

PS-3248

The Wireless Light and Color Sensor features two separate apertures: One measures ambient light from the side of the box, and the other measures percent color of directional light at the end of the box.

Features:

- Wirelessly connects to computers, Chromebooks, tablets, and smartphones
- Simply pair and go, no cables or adapters to manage
- On-board memory enables the sensor to function as an independent datalogger
- Variable sampling rate for short, precise experiments or lengthy, multi-day data collection.
- Bluetooth connectivity and long-lasting coin cell battery
- Indirect PAR measurements for biological studies



Order Information

Wireless Light and Color Sensor.....PS-3248

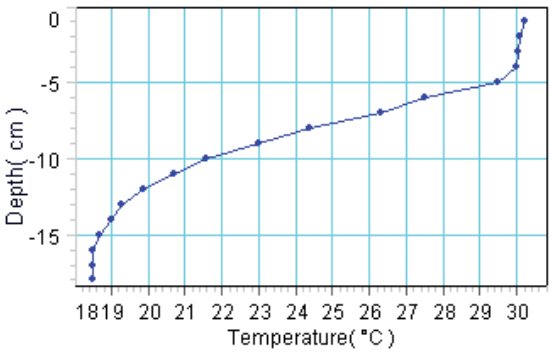
Wireless Light Sensor Pack.....PS-3338

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Density Circulation Model

ME-6816

The PASCO Density Circulation Model allows students to model, measure and understand the complex density-driven circulation associated with heat transfer through convection. Students can recreate vertical ocean currents driven by water bodies with density differences. They can extend this learning by using sensors to collect data and create graphs showing the thermocline, halocline and pycnocline using a Salinity Sensor PS-2195 (page 81).



Order Information

Density Circulation Model ME-6816

Wireless Optical Dissolved Oxygen Sensor

PS-3246

The Wireless Optical Dissolved Oxygen (ODO) Sensor is ideal for monitoring DO_2 in the lab or field. The Wireless Optical DO Sensor contains three different probes. In addition to the dissolved oxygen sensor, it also includes probes for measuring atmospheric pressure and water temperature. The optical technology is fast, accurate, and does not require stirring, filling solutions, warm-up, or frequent calibration. The included waterproof probe is submersible to a depth of 2.5 m. The sensor box is not waterproof.

A PASCO exclusive feature allows you to log data using the sensor's built-in memory. After collecting data for hours or even days, simply connect the sensor to your device and you're ready to download your data. With this powerful sensor, educators can explore day and night nutrient cycles, changes in metabolic processes, seasonal changes in water quality, and more.

Order Information

Wireless Optical Dissolved Oxygen Sensor PS-3246

EcoZone System

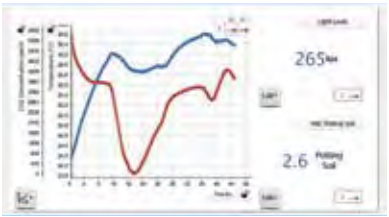
ME-6668

PASCO's EcoZone System is designed to help students model and understand complex interactions within, and among, different ecosystems. The three clear, acrylic EcoChambers are specially designed to accommodate PASCO sensors, making qualitative and quantitative measurements easily accessible.

Students can use the interconnected chambers to model interactions between three different ecosystems. Choose the traditional terrestrial, aquatic, and decomposition environments, or create unique biomes to model and measure. With the EcoZone System, students can create two identical ecosystems for precise control of variable impact, decouple the system for isolated investigations, or connect all three chambers to study interactions.

Features:

- Total volume of each chamber is 4,534 cm^3
- Sturdy construction designed for easy setup and cleanup
- Quantitatively study the interaction of different ecosystems
- Custom molded for use with PASCO sensors
- Clear acrylic allows for observations from all sides



Order Information

EcoZone System ME-6668

Greenhouse Sense & Control Kit

ST-2997

Designed for the exploration of biological and ecological concepts, the Greenhouse Sense & Control Kit includes everything students need to design, build, program, and study their very own greenhouse.

Build career awareness with activities that make real-world connections to:

- Agricultural monitoring
- Ecological management
- Plant physiology

Help students develop competency in:

- Coding
- Problem solving
- Data collection and analysis
- Ecological concepts
- Science & Engineering practices

This kit includes an EcoChamber, //control.Node, Power Output Module, Soil Moisture Probe, USB Fan and Water Pump, PASCO Grow Light, Greenhouse Accessory Kit, and a Greenhouse Sensor that measures light, temperature, humidity, and soil moisture.

Order Information

Greenhouse Sense and Control Kit ST-2997

Wireless Colorimeter & Turbidity Sensor

PS-3215

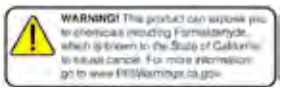
The Wireless Colorimeter & Turbidity Sensor simultaneously measures the absorbance and transmittance of six different wavelengths. The sensor can be used to study Beer's Law (absorbance vs. concentration), enzyme activity, photosynthesis, and the rates of chemical reactions (absorbance vs. time). After a simple calibration, students can quickly begin viewing live measurements as they materialize across the visible spectrum at 650 nm (red), 600 nm (orange), 570 nm (yellow), 550 nm (green), 500 nm (blue), and 450 nm (violet).

This sensor also functions as a high-quality turbidimeter for water quality analysis. Rather than simply measuring transmitted light, the Wireless Colorimeter and Turbidity Sensor measures light scattered at a 90 degree angle from the sample, resulting in accurate and repeatable measurements. Additionally, the internal housing for the cuvette is opaque, which limits ambient light interference to preserve accuracy.

Features:

- Stabilized light source for consistent readings
- Measures six different wavelengths simultaneously
- PASCO software displays the absorbance & transmittance at each wavelength in the appropriate color
- Quick and easy calibration
- Wireless design enables data collection in the field
- Pre-calibrated for ezSample Snap Vial Kits

Measure the absorbance and transmittance of a solution at six different wavelengths... simultaneously!



Order Information

Wireless Colorimeter & Turbidity Sensor.....PS-3215

Includes USB charging cable, 9 cuvettes, 2 cuvette racks, and one 100 NTU calibration cuvette.

Wireless Colorimeter & Turbidity Sensor Pack PS-3334

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Chemical Water Quality Testing in the Field

PASCO's ezSample water quality test kits simplify the chemical testing of water sources. Avoid the mess and difficulty of handling chemicals directly and get great results, even in the field.

Colorimetric Analysis

Conduct colorimetric tests in the field and avoid the mess and tedium of mixing chemicals. These ezSample Snap Vials contain a pre-formulated reagent to test a variety of water quality parameters. No more guessing at color variations—drop the vial into the Water Quality Colorimeter and read the concentration.

ezSample Snap Vial Kits
Requires Wireless Colorimeter (left)

ezSample Field Titrator Kits

Turbidity Vial Hood

Order Information

ezSample Snap Vial - Iron.....EZ-2331

ezSample Snap Vial - Nitrate*.....EZ-2333B

ezSample Snap Vial - Ammonia.....EZ-2334A

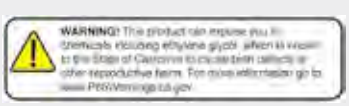
ezSample Snap Vial - Phosphate.....EZ-2337

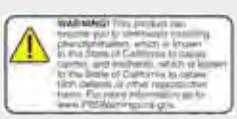
ezSample Snap Vial - Chlorine.....EZ-2339A

ezSample Field Titrator - Total Hardness.....EZ-2338

ezSample Field Titrator - Carbon Dioxide**.....EZ-2341

ezSample Field Titrator - Alkalinity.....EZ-2340

* 

** 

PASPORT Salinity Sensor

PS-2195

The PASPORT Salinity Sensor works with the 10X Salinity Sensor Probe to measure the salinity, conductivity, and temperature of fresh to brackish water sources. The sensor determines salinity based on electrical conductivity. It also features a built-in calculation, based on the Practical Salinity Scale (PSS), that compensates for changes in conductivity caused by temperature changes.

Order Information

PASPORT Salinity Sensor PS-2195

PASPORT Non-Contact Temperature Sensor

PS-2197

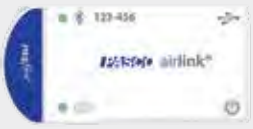
The Non-Contact Temperature Sensor measures surface temperature by detecting the emitted infrared light. Record the temperature of objects without touching them!

Order Information

PASPORT Non-Contact Temperature Sensor.....PS-2197

Go Wireless with PASPORT Sensors

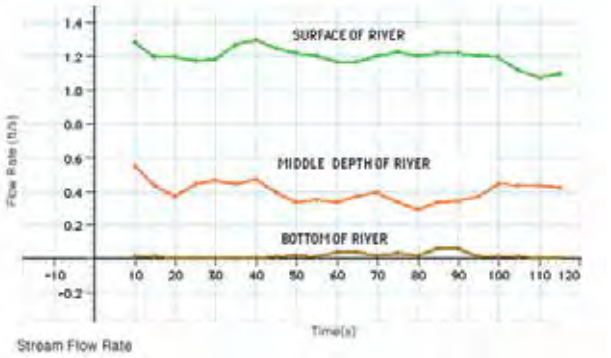
PASCO's AirLink Interface connects PASPORT (blue) sensors to your computer using Bluetooth or USB technology.



PASPORT Flow Rate/Temperature Sensor

PS-2130

PASCO's Flow Rate Sensor allows students to measure the temperature and rate of movement of streams, rivers, and other flowing systems. The propeller is a rugged, single-piece unit encased by protective material — no more losing pieces at the bottom of the stream.



Graph shows the flow rates at the top (green), middle (orange), and bottom (brown) of a stream.

Order Information

PASPORT Flow Rate/Temperature Sensor.....PS-2130

AirLink Interface

PS-3200

The AirLink connects PASPORT sensors to a Mac or Windows computer, Chromebook, iPad, tablet, or smartphone via Bluetooth or USB connection. The USB cable is included.

Order Information

AirLink Interface PS-3200

PASCO's Integrated Solutions for Physics

At PASCO, we aim to provide high school physics educators with the most groundbreaking solutions on the market. Our physics solutions pair wireless, cross-platform technology with engaging, hands-on labs to help foster active science learning.

Physics

Solutions for General, Honors, IB®, and AP® Physics

Perform more hands-on physics labs with PASCO. Our award-winning sensors, Essential curriculum, and data-collection software let students discover physics through hands-on experimentation. Whether you teach Honors, IB®, AP® Physics 1 or 2, or General Physics, you're sure to find a PASCO solution that's right for you and your students.

Are you receiving our Physics Catalog? It includes our full line of physics equipment!

pasco.com/catalogs

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Physics Lab Station: Mechanics Starter

The Physics Lab Station: Mechanics Starter bundle is a lab-ready solution for performing several key experiments in mechanics. It includes a sensor-loaded Smart Cart, a durable PAStrack, and a variety of accessories that support student studies of core topics such as velocity, conservation of energy, and Newton's second law.

Real-Time Sensor Measurements-Students can use the Smart Cart's built-in sensors to make real-time measurements of position, velocity, acceleration, force, and rotation, displaying them as the lab unfolds for more meaningful learning. They can also collect and compare data from multiple trials, easily apply lines of fit, and perform statistical analysis using PASCO software.

Ready-Made Mechanics Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Average Speed and Velocity
- Graphing Motion
- Speed and Velocity Graphs
- Conservation of Energy
- Work and Kinetic Energy
- Newton's Second Law
- Coefficients of Friction
- Momentum and Impulse
- Periodic Motion: Mass and Spring

Mechanics Starter Equipment List

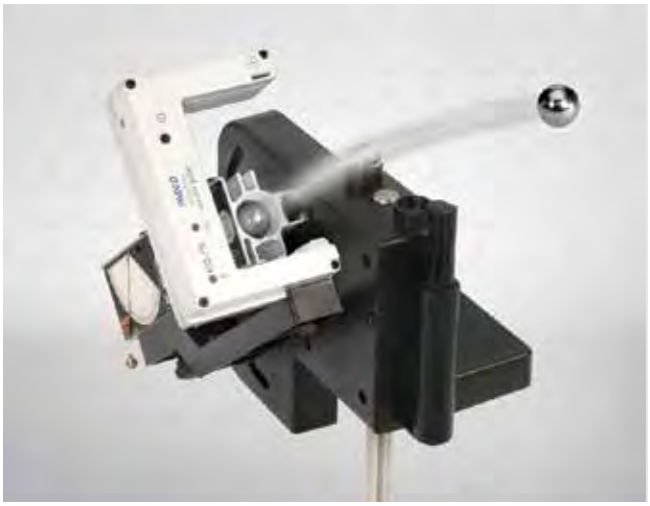
Equipment	Part #	Qty.
Smart Cart (red)	ME-1240	1
Smart Cart Rod Stand Adapter	ME-1244	1
Cart Mass (set of 2)	ME-6757A	2
PAStrack	ME-6960	1
Aluminum Meter Stick		1
Dynamics Track End Stop (2 pack)	ME-8971	1
Small "A" Base	ME-8976	1
Stainless Steel Rod, 60 cm Threaded	ME-8977	1
Mass & Hanger Set	ME-8979	1
Dynamics Track Spring Set	ME-8999	1
Super Pulley Kit	ME-9433	1
Angle Indicator	ME-9495A	1
Multi-Clamp	ME-9507	1
Friction Block	ME-9807	1
Track Rod Clamp	ME-9836	1
Bumper Accessory Set	ME-9884	1

Order Information

Physics Lab Station: Mechanics Starter.....ME-5300

Physics Lab Station: Mechanics Extension

The Physics Lab Station: Mechanics Extension bundle expands your physics toolbox, allowing students to explore topics such as statics, rotation, projectile motion, and periodic motion. It includes an additional Smart Cart for studying collisions, a Mini Launcher for firing projectiles, and a Wireless Smart Gate for timing events accurately. A variety of accessories are also included.



Real-Time Sensor Measurements-Students can use the Wireless Smart Gate and patented Smart Cart to monitor key measurements in real time, displaying them as the lab unfolds for more meaningful learning. Use the Smart Cart's built-in sensors to measure motion on or off the track, or time events with precision using the dual-beam Wireless Smart Gate. Students can also collect and compare data from multiple trials, easily apply lines of fit, and perform statistical analysis using PASCO software.

Ready-Made Mechanics Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Conservation of Momentum
- Momentum and Explosions
- Simple Pendulum
- Atwood's Machine
- Two Dimensional Motion: Projectiles
- Exploring Torque
- Exploring a Rotating System
- Momentum and Impulse
- Exploring Physical Pendulums

Mechanics Extension Equipment List

Equipment	Part #	Qty.
Smart Cart (Blue)	ME-1241	1
Photogate Mounting Bracket	ME-6821A	1
Mini Launcher	ME-6825B	1
Pivot	ME-7034	1
Meter Stick Torque Mass Hanger Set	ME-7035	1
Photogate Pendulum Set	ME-8752	1
Pendulum Clamp	ME-9506	1
Photogate Wireless Smart Gate	PS-3225	1

Order Information

Physics Lab Station: Mechanics Extension ME-5301

Required:

Physics Lab Station: Mechanics Starter.....ME-5300

Physics Lab Station: Fluids

The Physics Lab Station: Fluids bundle enables students to perform several essential experiments in fluids. It includes a Wireless Pressure Sensor for making measurements of pressure in liquids and gases. A Density Set and Overflow Can are included for measuring buoyant forces in fluids.

Real-Time Sensor Measurements-Students can use the Wireless Pressure Sensor to make real-time measurements of pressure in liquids or gases, displaying them as the lab unfolds for more meaningful learning. They can also collect and compare data from multiple trials, easily apply statistics, and export their data using PASCO software.

Ready-Made Fluids Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Boyle's Law
- Hydrostatic Pressure
- Buoyant Force

Fluids Equipment List

Equipment	Part #	Qty.
Wireless Pressure Sensor	PS-3203	1
Density Set	ME-8569A	1
Overflow Can	SE-8568A	1

Order Information

Physics Lab Station: Fluids.....ME-2040

Required:

Physics Lab Station: Mechanics Starter.....ME-5300

Physics Lab Station: Electricity and Magnetism

This lab-ready equipment set supports experiments in electricity and magnetism across all levels of physics. It includes Wireless Voltage, Current, and Magnetic Field Sensors, an Essential Physics Modular Circuits Kit, and an Electronic Components Kit.

Textbook Circuits for the Real World-The Essential Physics Modular Circuits Kit brings 2D circuitry to the real world, allowing students to study and measure circuits using components that look like textbook models. Each square piece displays both the physical component (resistor, capacitor, etc.) and the schematic to help bridge the gap between circuit diagrams and functioning circuits.

Real-Time Measurements-Students can use the Wireless Voltage and Current Sensors to make measurements anywhere in their circuit. Voltage and current readings are displayed in real time, allowing students to quickly compare and contrast different circuit configurations. They can also use PASCO software to collect and compare data, apply lines of fit, and perform statistical analysis.

Ready-Made Electricity & Magnetism Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Ohm's Law
- DC Circuits
- Capacitors and RC Circuits
- Magnetic Field of a Permanent Magnet
- Electromagnetic Induction
- Magnetic Field in a Coil
- Planck's Constant

Electricity & Magnetism Equipment List

Equipment	Part #	Qty.
Essential Physics Modular Circuits Kit	EM-3536	1
Wireless Current Sensor Module*	EM-3534	1
Wireless Voltage Sensor*	PS-3211	1
Wireless Magnetic Field Sensor	PS-3221	1
Electronic Components Kit	EM-8818	1

* Included with EM-3536

Order Information

Physics Lab Station: Electricity and Magnetism.....EM-3557

Physics Lab Station: Optics

The Physics Lab Station: Optics bundle is a lab-ready solution for performing a wide range of optics experiments – from introductory investigations of lenses to advanced experiments in Snell's Law. It includes a Basic Optics Ray Table, a Light Source, Concave and Convex Mirrors, and various lenses and accessories. The included equipment mounts easily to a PASCO Dynamics Track or a 1.2m Optics Track (sold separately) for hassle-free alignment.

Ready-Made Optics Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Spherical Mirror Reflection
- Snell's Law
- Focal Length of a Converging Lens
- Virtual Images
- Telescope and Microscope
- Shadows

Optics Equipment List

Equipment	Part #	Qty.
Concave/Convex Mirror	OS-8457	1
Basic Optics Viewing Screen	OS-8460	1
Basic Optics Ray Table	OS-8465	1
Basic Optics Light Source	OS-8470	1
Dynamics Track Optics Carriages (Set of 4)	OS-8472A	1
Basic Optics Geometric Lens Set	OS-8456	1
Accessory Lens Set	OS-8519	1

Order Information

Physics Lab Station: Optics.....OS-8910
Required:
Physics Lab Station: Mechanics Starter.....ME-5300
Or:
Optics Track, 1.2 m.....OS-8508

Physics Lab Station: Waves and Sound

The Physics Lab Station: Waves & Sound bundle is a lab-ready solution for performing a variety of experiments in waves and sound. It includes a 2-in-1 Wireless Sound Sensor, a complete Tuning Fork Technical Set, a high-quality Resonance Air Column, and a Double-Length Slinky.

Real-Time Sensor Measurements-The Wireless Sound Sensor gives students unparalleled insight into the physics of sound and waves. Students can use the sensor to measure the frequency of a sound wave, and then visualize the waveform using PASCO software. Students can use the Double-Length Slinky to create a waveform with a partner, then use PASCO software to easily measure sound waves for further analysis.

Ready-Made Sound and Wave Labs-This kit is complemented by a collection of ready-made experiments that can be downloaded for free from the Experiment Library. Each lab comes ready-to-use with editable student handouts, teacher answer keys, and helpful teaching tips.

Perform These Experiments:

- Resonance and Standing Waves
- Properties of Sound Waves
- Measuring the Speed of Sound
- Decoding DTMF Tones

Waves and Sound Equipment List

Equipment	Part #	Qty.
Wireless Sound Sensor	PS-3227	1
Tuning Fork Technical Set	SE-7728	1
Resonance Air Column	WA-9606	1
Double-Length Slinky	SE-8760	1

Order Information

Physics Lab Station: Waves and Sound WA-9515

Essential Physics - Your COMPLETE Physics Solution

PASCO's Essential Physics is the only curriculum solution that includes a Student Textbook, Student e-Book, Teacher e-Resources, Student Lab Manual, and Equipment Kits, all at a very affordable price. This 3-D STEM program includes a full year of instruction for both General and Honors Physics classes. Use our complete solution or integrate Essential Physics into your existing curriculum.

Essential Physics is multiplatform and works on iOS, Android™, Chrome™, Windows®, and Mac®. What's more, it includes 24/7 online access, as well as correlations to NGSS and your state standards.

Student Textbook & Lab Investigations

- 27 chapters cover a full year of instruction for High School General and Honors Physics programs
- One main idea per page
- Quality illustrations
- Section and Chapter reviews
- 82 complete investigations
- 8 Engineering Design Projects

Student e-Book

- Browser-based version of the textbook
- Same layout with convenient 24/7 online access
- Embedded videos and animations bring content to life
- Interactive equations and simulations enrich key concepts
- Formative and summative assessment questions

Teacher e-Resources for Lab Manual

- SPARKvue software
- Editable documents
- PowerPoint presentations
- Answer keys
- Video lab assistance

Teacher e-Resources for Textbook

- Infinite Test Bank
- Teacher User Guide
- Teacher e-Book (1-year or multi-year license)
- Alignment details for NGSS and state standards

PASCO Academy Physics Resources

- Available through your PASCO Educator account
- 25 engaging video labs with detailed instruction and data collection
- 25 datasets for student analysis and discussion
- 25 editable lab handouts with teacher answer keys
- Digital access to more than 80 labs for General and Honors Physics

Essential Physics correlates with NGSS and is constructed around the three dimensions:

- Science and Engineering Practices
- Crosscutting Concepts
- Disciplinary Core Ideas

NEXT GENERATION SCIENCE STANDARDS

Textbook + e-Book + Equipment

Essential Physics (3rd Edition) Student Textbook

EP-6323

This rigorous yet accessible textbook includes core physics topics that cover a complete year of instruction for both High School General and Honors Physics classes. The lessons follow the 5E model and include tools for ELL students, as well as tools for students with different learning styles. The curriculum aligns to NGSS and your state standards for both regular and advanced coursework. The accessible textbook includes one main idea per page, quality illustrations, 89 complete investigations, eight Design Projects, and Section and Chapter Reviews. The 27 chapters cover these topics:

- Science of Physics
- Physical Quantities and Measurement
- Position and Velocity
- Acceleration
- Forces and Newton's Laws
- Motion in Two and Three Dimensions
- Circular Motion
- Static Equilibrium and Torque
- Work and Energy
- Conservation of Energy
- Momentum and Collisions
- Machines
- Angular Momentum
- Harmonic Motion
- Sound Waves
- Electricity and Circuits
- Electric and Magnetic Fields
- Electromagnetism
- Light and Reflection
- Refraction and Lenses
- Electromagnetic Radiation
- Properties of Matter
- Heat Transfer
- Thermodynamics
- Quantum Physics and the Atom
- Nuclear Physics

Essential Physics Student e-Book

The Student e-Book is an electronic version of the full textbook with interactive elements. Throughout the electronic text, content and theory are supported with optional audio reading, as well as interactive elements, such as digital equations, videos, animations, and simulations. Students also have the option of expanding the content using the 'more' button to go deeper into concepts.

Essential Physics Labs & PASCO Equipment Bundles

Use PASCO's Physics Lab Stations to perform the following hands-on investigations from *Essential Physics.*

ME-5300 Physics Lab Station: Mechanics Starter

- **1A:** Graphs of motion
- **3B:** Motion graphs
- **4A:** Acceleration
- **4B:** A model for accelerated motion
- **5A:** Newton's second law
- **5B:** Hooke's law
- **5C:** Static and kinetic friction
- **6C:** Acceleration on an inclined plane
- **9A:** Work and the force versus distance graph
- **10A:** Inclined plane and the conservation of energy
- **10B:** Work and energy
- **10C:** Springs and the conservation of energy
- **10D:** Work done by friction
- **11C:** Elastic collisions
- **12C:** Ramps and inclined planes

ME-5301 Physics Lab Station: Mechanics Extension

- **6B:** Projectile motion
- **11A:** Conservation of momentum
- **11B:** Inelastic collisions
- **14A:** Oscillators
- **14C:** Resonance

EM-3557 Physics Lab Station: Electricity and Magnetism

- **17A:** Electricity and circuits
- **17B:** Voltage and batteries
- **17C:** Resistors and Ohm's law
- **17D:** Series and parallel circuits
- **17E:** Electrical power
- **17F:** Compound circuits
- **18A:** Magnetic force between magnets

OS-8910 Physics Lab Station: Optics

- **20A:** Magnification of mirrors and lenses
- **20B:** Reflection in a plane mirror
- **20C:** Image formation for curved mirrors
- **21A:** Refraction of light
- **21B:** Creating real and virtual images with lenses
- **21C:** Image formation for a convex lens
- **21D:** Build a microscope and a telescope

WA-9515 Physics Lab Station: Waves and Sound

- **15A:** Waves
- **15C:** Interference
- **16D:** Resonance and Sound

Additionally, the following labs can be performed with the Simple Machines Kit (EP-3577):

- **8A:** Static equilibrium
- **12A:** Levers
- **12B:** Pulleys

Basic Modular Circuits Kit

EM-3535

These circuit modules are designed specifically for introductory circuit investigations. For students who have never wired a circuit, this modular system makes it easy for them to see their circuit physically laid-out exactly as it appears in their circuit diagram.

Each module connects mechanically to another by sliding the tabs into each other. It works on any tabletop. No special surface is required. To electrically connect two modules, students insert a jumper clip, which emphasizes that an electrical connection has been made. The large size of the modules (8 cm x 8 cm) enables all the students around the table to see and understand the completed circuit.

Each module connects mechanically to another by sliding the tabs into each other. To make them visible, many of the components are mounted on top of the module or in a well for protection.

The Basic Modular Circuits Kit is a lower cost, introductory set with fewer components than the Essential Physics Modular Circuits Kit. The Wireless Voltage Sensor and Wireless Current Module are not included.

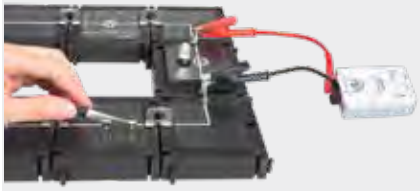
Order Information

Basic Modular Circuits Kit.....EM-3535

Essential Physics Modular Circuits Kit

EM-3536

The Essential Physics Modular Circuits Kit includes more modules, such as the Wireless Current Sensor Module and Wireless Voltage Sensor. The Essential Physics Modular Circuits Kit will also support applications like RC and RLC circuit analysis, electric motors, Kirchhoff's Laws, and much more!



The Essential Physics Modular Circuits Kit seamlessly integrates sensors, like the Wireless Current Sensor Module & Wireless Voltage Sensor.

Order Information

Essential Physics Modular Circuits Kit.....EM-3536

Modular Circuits Expansion Kit.....EM-3540

Compare Modular Circuit Kits

Kits include these modules and apparatus:

	Basic EM-3535	Essential EM-3536	Expansion EM-3540
Corner Wire	4	4	2
Straight Wire	4	5	2
Tee	2	2	2
Spring	1	1	1
Switch, SPDT	1	1	
Switch, SPST	1	1	
Resistor	2	3	
Capacitor	1	1	
Light Bulb	2	3	1
Potentiometer	0	1	
Motor	0	1	
LED	0	1	
1000 Turn Coil	0	1	
Battery Holder	2	2	1

	Basic EM-3535	Essential EM-3536	Expansion EM-3540
Battery, AA	2	2	
Jumper Clips	30	45	15
Diode	1	1	
330 ohm Resistor	1	2	
1000 ohm Resistor	1	2	
100 microfarad Capacitor	1	1	
330 microfarad Capacitor	1	1	
Magnets, 0.45" x 0.25"	0	8	
Plotting Compass	0	1	
Alligator Clip Jumper Wire	0	1	
EM-3534 Wireless Current Sensor	0	1	
PS-3211 Wireless Voltage Sensor	0	1	
Gratnells® Storage Tray	1	1	1
Banana Jack Terminal			1

Wireless AC/DC Module

EM-3533

The Wireless AC/DC Module is a Bluetooth® wireless signal generator designed for use with PASCO's Modular Circuits. The AC/DC Module can act as a DC power supply, as well as generate Sine, Triangle, and Square AC signals. A built-in battery provides long lasting power for your basic circuits, and it can be recharged using the included USB cable. An internal voltage sensor monitors the output voltage at all times. The Wireless AC/DC Module is controllable in either PASCO Capstone or SPARKvue software. This latest circuit module expands the number and type of experiments you can perform with Modular Circuits including Ohm's Law, RC Circuit Time Constant, and LRC labs.

Programmable using Blockly programming in PASCO Capstone 2 and SPARKvue software.

Features:

- Compatible with Modular Circuits
- ±3 V Output; 0.3 A Max
- DC, Sine, Triangle, Square
- Bluetooth® Low Energy
- Rechargeable Battery
- Controllable with PASCO Capstone or SPARKvue Software

Order Information

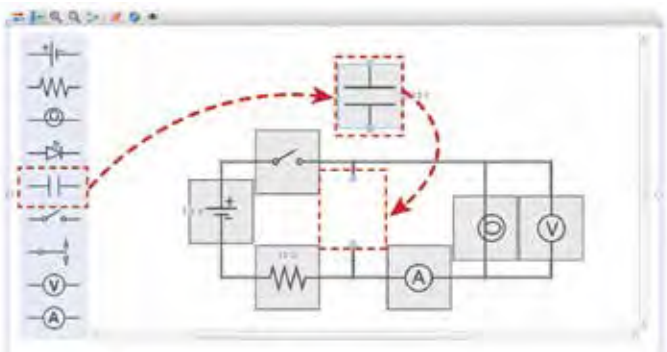
Wireless AC/DC Module EM-3533

Perform Circuits Emulations with Modular Circuits and PASCO Capstone 2

Reinforce circuit concepts and tackle student misconceptions using circuit visualization.

When you use Modular Circuits with PASCO Capstone 2 and its Circuits Emulation tool, you can:

- Construct and modify circuits
- Show conventional current or electron flow animation
- Animate circuits with live sensor data



Learn more about Capstone 2 on pages 110-113.

Wireless Motion Sensor

PS-3219

The Wireless Motion Sensor connects via Bluetooth® or USB to your device, and uses ultrasound to measure the position, velocity, and acceleration of objects. This enables students to take turns measuring themselves, while the class observes their motion materializing as a graph in real time. The sensor can detect objects ranging from 15 cm to 4.0 m away, and without cables to get in the way, students can explore handheld and ceiling-mounted applications.

Features:

- Measures position, velocity, and acceleration
- False Target Rejection Technology produces clean data
- Clips directly to PASCO Dynamics Tracks
- Rod clamp for mounting
- 180° pivoting head
- Rechargeable lithium-ion battery
- Bluetooth® and USB connectivity

Order Information

Wireless Motion Sensor PS-3219
Wireless Motion Sensor Pack.....PS-3337

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

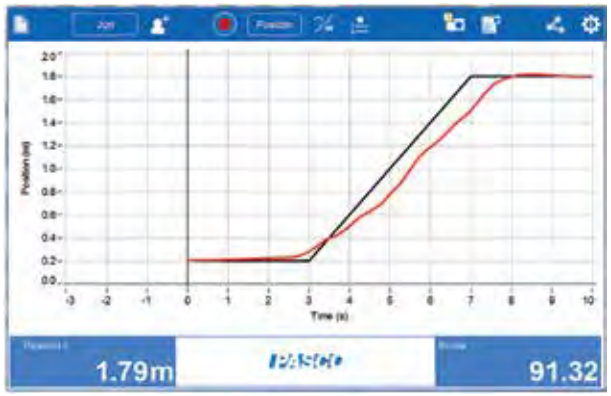
Free MatchGraph! Software

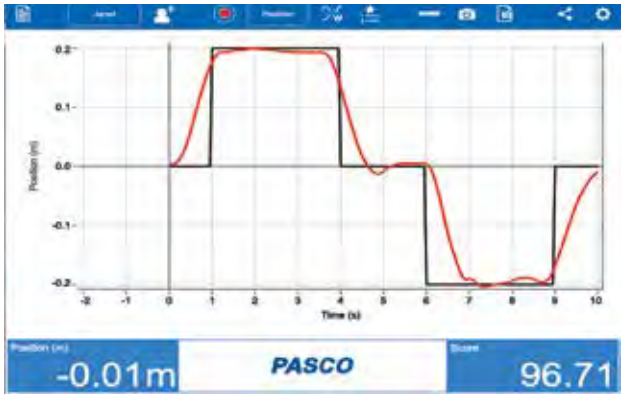
MatchGraph software is the most intuitive way to teach motion graphing. Engage your students with a kinesthetic experience that teaches graphing centered on motion. In MatchGraph, students attempt to match one of the nine provided graphs and are given a score showing how accurately they match the chosen curve. This activity gives them a deeper understanding of interpreting graphs as they see their own position and velocity graphed in real time.

Using a PASCO Motion Sensor, students create graphs of their own motion that they can then analyze. When using a Smart Cart, a real-time motion graph is displayed as students move the cart.

MatchGraph is great for teaching:

- Fundamental graphing skills
- Basic concepts of position and velocity
- The concept of slope
- What it means when the slope is zero
- How position and velocity graphs relate to each other





Download the Free *MatchGraph!* App

For Mac® and Windows® computers, visit **pasco.com/downloads.** Download the free iPad® or Android™ app from the App Store or Google Play.

ANDROID APP ON Google play

Download on the App Store

Smart Cart (Red/Blue)

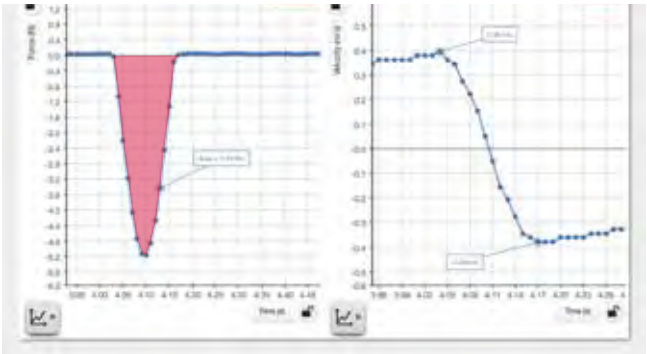
ME-1240/ME-1241

The patented Smart Cart is the ultimate tool for studying kinematics, dynamics, Newton's laws, and more. It is based on a durable ABS body with nearly frictionless wheels, just like our high quality PAScars. Now, we've added built-in sensors that measure force, position, velocity, and acceleration. The versatile Smart Cart can collect measurements on or off a track and transmit the data wirelessly over Bluetooth®. In essence, it is a wireless dynamics cart that combines all the necessary sensors, without requiring any additional hardware.

Smart Carts are ideal for studying mechanics topics, such as kinematics and dynamics. The built-in load cells enable two Smart Carts to visually demonstrate Newton's third law with ease. Additionally, built-in sensors for force and acceleration enable students to investigate Newton's second law in minutes. Smart Carts truly are a physics lab on wheels, and now you can own the most advanced physics cart ever created, all without the restrictions of cables.

Features:

- Built-in ±100 N force sensor
- 3-axis accelerometer
- Bluetooth® connectivity
- Rechargeable battery
- Motion encoder measures position and velocity on or off the track
- Magnetic bumper for force sensor
- 3-position plunger
- Mass tray
- Velcro® tabs
- Force sensor hook and rubber bumper



Patent No. 10,481,173

The graphs show the impulse experienced and the change in velocity created by a collision between a Wireless Smart Cart and a cardboard bumper.

Measure the force exerted directly on the cart when the hook is pulled by a string attached to a mass hanging over a pulley.

Smart Cart Charging Garage

ME-1243

Charge up to five Smart Carts at once. Provides storage for the carts and accessory bumpers. Includes power adapter.

Order Information

Smart Cart (Red)	ME-1240
Smart Cart (Blue)	ME-1241
Smart Cart Charging Garage	ME-1243

Smart Cart Demonstration Kits

ME-1272 (RED)/ME-1273 (BLUE)

The Red & Blue Smart Cart Demonstration Kits come with a Smart Cart and all the accessories you need to perform amazing physics demonstrations in kinematics and dynamics.

Features:

- Smart Cart (red or blue)
- Smart Fan Accessory
- Two 250-g Cart Masses
- Smart Cart Rod Stand Adapter
- Ballistic Cart Accessory
- Smart Cart Vector Display
- Sail
- Gratnells Case
- Demonstration Manual

Order Information

Red Smart Cart Demonstration Kit ME-1272
Blue Smart Cart Demonstration Kit.....ME-1273

Smart Cart Vector Display

ME-1246

The Smart Cart Vector Display adds visual vectors to your Smart Cart for Force, Acceleration, or Velocity. Connect it to the Smart Cart's accessory port to visualize vectors in real time! The arrows light up proportional to the sensor reading and indicate both magnitude and positive or negative direction.

Features:

- Choose from Force, Acceleration, or Velocity vectors, and watch them in real time
- Students can visualize constant acceleration as a cart rolls up and then down an incline
- Great for the student lab station or for a physics lecture demonstration!
- Selectable ranges

Order Information

Smart Cart Vector Display ME-1246

Smart Ballistic Cart Accessory

ME-1245

The Smart Ballistic Cart Accessory mounts to any PASCO dynamics cart for a classic demonstration on the independence of X and Y motion. A projectile fired from the accessory while a cart is in motion will be caught farther down the track. When mounted to a PASCO aluminum cart or PAScar, the projectile is launched using a push button timer delay. When connected to a PASCO Smart Cart, the Smart Ballistic Accessory can launch the projectile based on measurements made by the Smart Cart in either SPARKvue or PASCO Capstone software.

Features:

- Compatible with all PASCO dynamics carts
- Push button timer to delay the launch of the projectile until after the cart is pushed
- Release mechanism does not affect cart motion or ball flight path
- The barrel has X and Y adjustments, so perfect vertical projections can be produced every time
- Fires a colored nylon ball 0.5 meters or higher for impressive demonstrations
- Connects to the Smart Cart for measurement-based launching conditions
- USB rechargeable Li-ion battery

Order Information

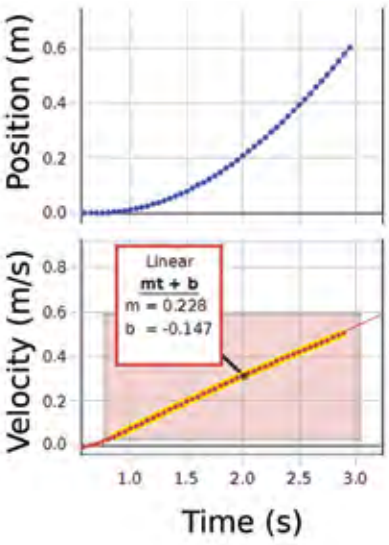
Smart Ballistic Cart Accessory ME-1245

Smart Fan Accessory

ME-1242

What makes this fan so smart? If you use this fan on a regular cart, you can turn it on and select one of three speeds by pushing the button on the side. But plugging it into a Smart Cart gives this Smart Fan Accessory added capabilities:

- **Hands-off Operation:** Turn the Smart Fan on and off wirelessly from your computing device.
- **Adjust the Thrust:** Move the slider in the software and watch the fan respond.
- **Reverse the Spin of the Fan:** Input a negative thrust to make the fan blow in the opposite direction.
- **Set Start and Stop Conditions:** Choose to start the fan when a measurement (such as position) reaches a certain value. Make the fan stop after a certain time, so the cart coasts during part of the experiment.
- **Sense and Control:** Program the Smart Fan thrust to respond to a calculation based on sensor measurements.

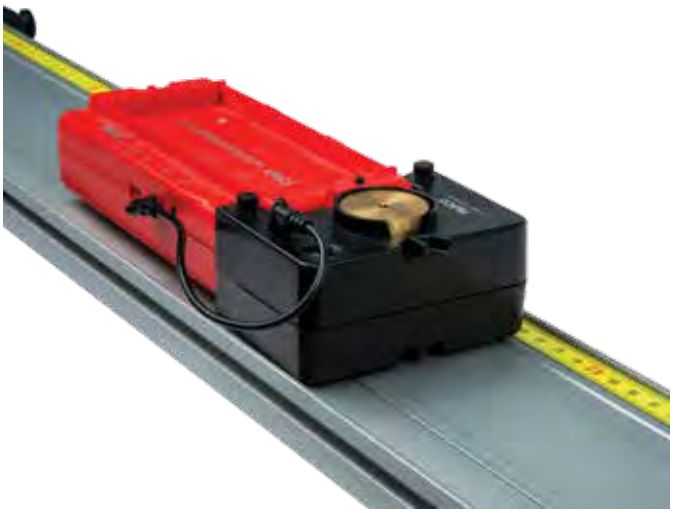


Sample position and velocity data.

Patent No. 10,482,789

Order Information

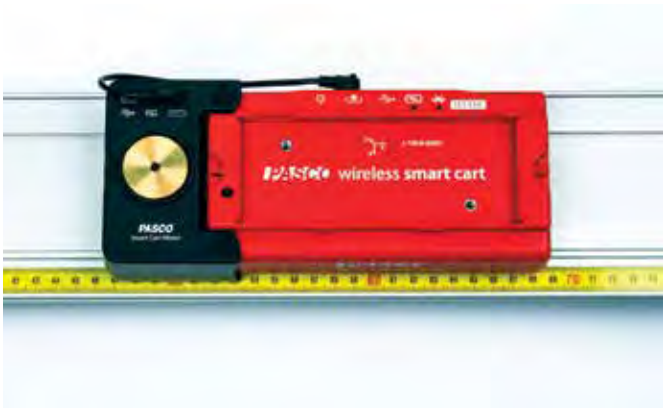
Smart Fan Accessory ME-1242



Smart Cart Motor

ME-1247

The Smart Cart Motor is a motor-driven wheel that attaches to the Smart Cart to make it go at a constant velocity, forwards or backwards. The motor's power can be wirelessly adjusted from 0 to 100% using either SPARKvue or PASCO Capstone software.



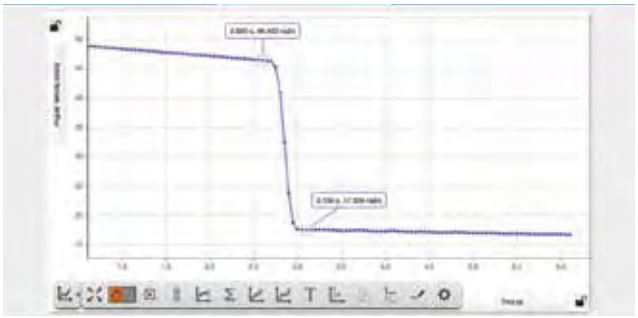
Order Information

Smart Cart Motor ME-1247

Wireless Rotary Motion Sensor

PS-3220

The Wireless Rotary Motion Sensor measures angle, angular velocity, and angular acceleration, as well as their linear equivalents. The included three-step pulley can be rotated at different rates of acceleration to apply various torques. Use the rod-mounting holes to easily position the sensor for different experiments. This sensor connects directly to your devices via Bluetooth® or USB.



Order Information

Wireless Rotary Motion Sensor PS-3220

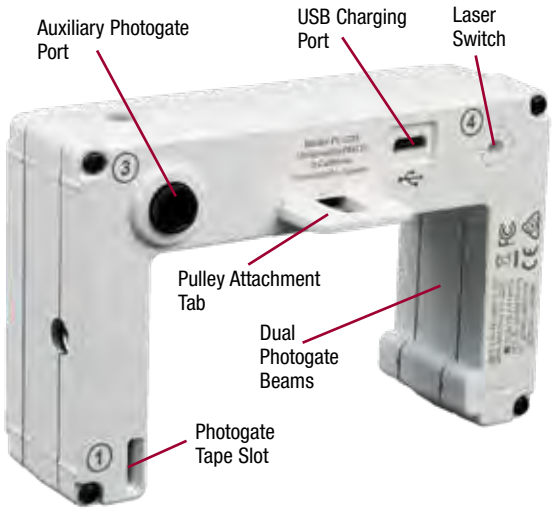
Wireless Smart Gate

PS-3225

The Wireless Smart Gate is more than just a photogate. It has dual photogate beams spaced 1.5 cm apart to accurately measure speed. When used with a laser, students can use the built-in laser switch to time objects that are too large to fit through the photogate beams. It also includes a photogate tape slot for measuring the movement of objects and an auxiliary port for adding another photogate head or the Time-of-Flight Accessory.

Highlights:

- Dual photogate beams
- Laser switch
- Auxiliary photogate/ Time-of-Flight port
- Photogate tape slot
- USB and Bluetooth®
- Rechargeable



Projectile Launcher

ME-6800

The Projectile Launcher demonstrates the concept that motion in different dimensions is absolutely independent. A good launcher not only illustrates this non-intuitive idea, but it also describes the exact motion of the projectile. PASCO has precision-engineered the Projectile Launcher to be durable, accurate, and consistent for highly repeatable results.

Projectile Launcher Wireless Smart Gate System

ME-6796

Choose this wireless option to eliminate cables between the computer and Projectile Launcher. The Wireless Smart Gate has all the features of the Smart Gate (PS-2180), but it connects to your computing device via Bluetooth® or USB; it does not require an interface.

Includes:

- Wireless Smart Gate with Mounting Bracket
- Launcher with Mounting Stand
- Steel Balls with Loading Rod
- 2-D Collision Accessory
- Aluminum Table Clamp
- 45 cm Stainless Steel Rod

Mini Launcher

ME-6825B

PASCO's Mini Launcher provides a low-cost method for every student to thoroughly investigate projectile motion. The Mini Launcher has the same level of precision and accuracy as our larger Projectile Launcher (ME-6800), but is easier to assemble, simple to adjust, and provides built-in storage for the plunger and metal balls.

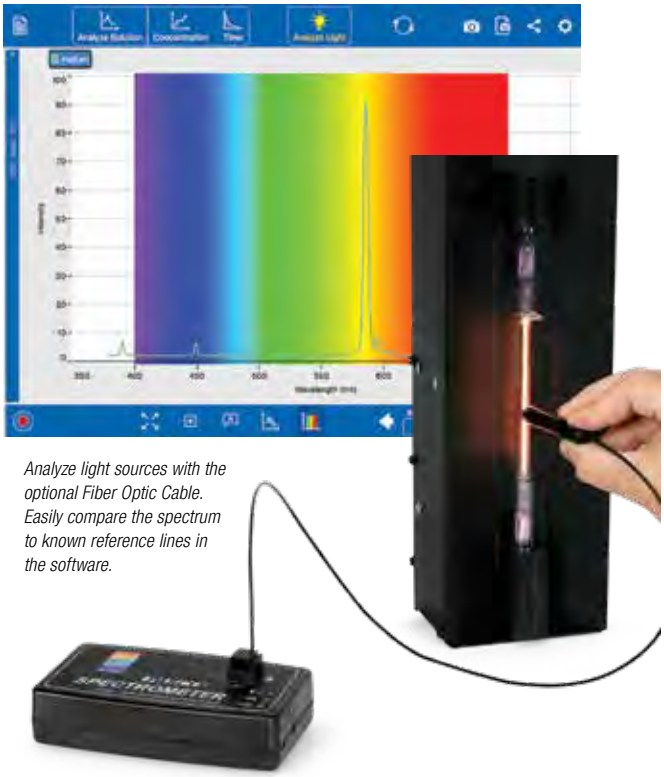
Order Information

Wireless Smart Gate	PS-3225
Mini Launcher	ME-6825B
Projectile Launcher Wireless Smart Gate System	ME-6796
Projectile Launcher	ME-6800

Wireless Spectrometer (Vis)

PS-2600

The award-winning PASCO Wireless Spectrometer is specifically designed for modern chemistry, biology, and physics labs. It connects to student devices via USB or Bluetooth® Low Energy and includes free Spectrometry software with built-in tools for spectral analysis. Scan times are fast, enabling students to collect a full spectrum of data in less than a second. Three plots are provided for common applications, including Absorbance vs. Wavelength (or Intensity vs. Wavelength), Absorbance vs. Concentration (Beer's law), and Absorbance vs. Time (kinetics).



Analyze light sources with the optional Fiber Optic Cable. Easily compare the spectrum to known reference lines in the software.

Order Information

Wireless Spectrometer (Vis) PS-2600A
Fiber Optic Cable PS-2601

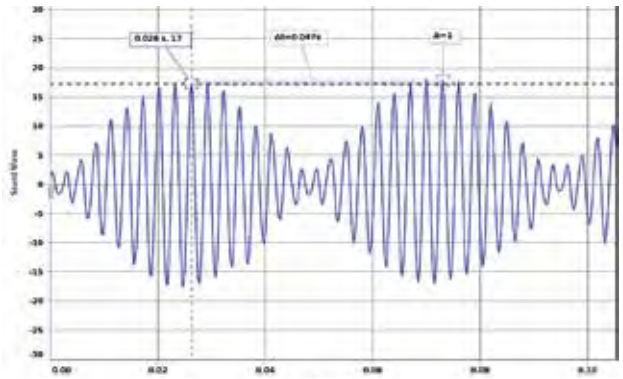
Wireless Sound Sensor

PS-3227

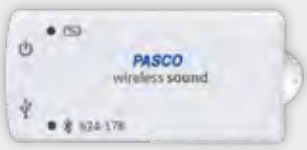
The Wireless Sound Sensor is two sensors in one wireless package: A sound wave sensor capable of measuring changes in relative pressure level as a function of time, and a sound level sensor with both dBA and dBC-weighted scales.

Features:

- Wirelessly collects sound wave data at high sample rates (100 kHz)
- Two sound sensors in one (sound wave and sound level)
- High quality sensing element intended specifically for laboratory experiments
- Connects seamlessly to Scope and FFT displays in both SPARKvue and PASCO Capstone software
- Threaded 1/4-20 socket for easy mounting and alignment/ positioning



Easily observe and measure beat frequencies



Order Information

Wireless Sound Sensor PS-3227
Wireless Sound Sensor Pack.....PS-3342
Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

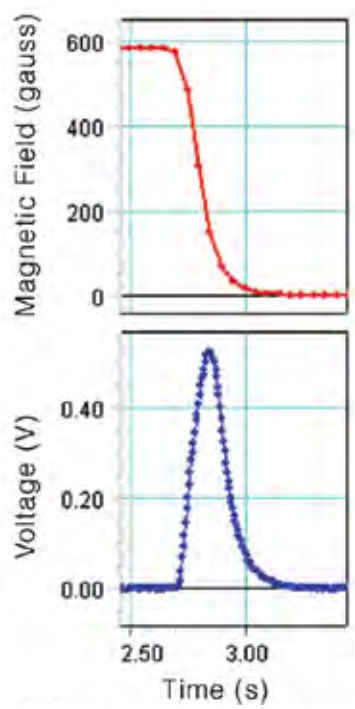
Wireless Magnetic Field Sensor

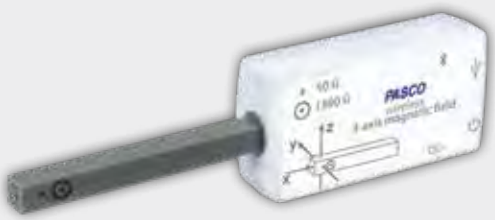
PS-3221

This 3-Axis Magnetic Field Sensor can sense the Earth's magnetic field and fields from coils and bar magnets. There are two ranges: ±50 gauss and ±1300 gauss. This sensor is primarily for static fields.

Highlights:

- Simultaneous measurements on three axes
- **Dual range:** ±50 G and ±1300 G
- Sensitive enough to measure the Earth's magnetic field
- Measure fields from bar magnets and coils





Order Information

Wireless Magnetic Field Sensor PS-3221

Wireless Acceleration/Altimeter

PS-3223

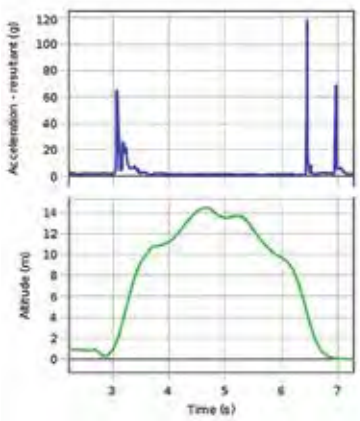
The Wireless 3-Axis Acceleration/Altimeter can remotely log acceleration in three dimensions and altitude, making it ideal for recording data during roller coaster rides.

Specifications:

Accelerometer Ranges: ±16 g, ±100 g, ±200 g, ±400 g
Measurements: Acceleration (3 axes and resultant); Altitude; Angular Velocity (3 axes)
Logging: Yes
Battery: Coin Cell
Connectivity: Bluetooth® 5.2
Dimensions: 3.02" x 1.6"

Highlights:

- 3-axis accelerometer
- 3-axis gyroscope
- Altimeter
- Rubberized case
- Includes mounting strap



Order Information

Wireless Acceleration/Altimeter.....PS-3223

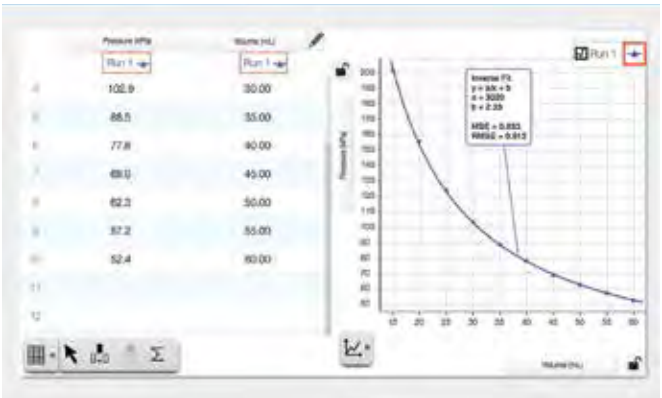
Wireless Pressure Sensor

PS-3203

The Wireless Pressure Sensor allows students to easily collect accurate gas pressure data for a wide range of applications. Included is a 60 cc syringe, tubing, and connectors that facilitate experiments such as Boyle's law and measuring pinch-grip strength. Within PASCO's software, students can easily select their desired units from a list containing kPa, mmHg, inHg, mbar, psi, atm, and torr.

Features:

- Measures pressure even when the pressure within the system drops below ambient pressure
- Supports common units (kPa, atm, psi, mmHg, or N/m^2) for many applications
- Bluetooth® wireless connectivity and long-lasting rechargeable battery



With the included syringe, your students can easily quantify the relationship between pressure and volume.

Order Information

Wireless Pressure Sensor PS-3203

Wireless Pressure Sensor Pack.....PS-3333

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Light and Color Sensor

PS-3248

The Wireless Light and Color Sensor features two separate apertures: One on the side of the box for ambient light measurements and one at the end of the box for directional light measurements for percent color.

The ambient sensor measures:

Lux: Light energy from a point in a direction (per steradian, a solid angle) per second.

Illuminance: Light intensity per area, or brightness in the range our eyes perceive.

Irradiance: Power of the light per area. (Depends on wavelength as UV light has more energy than infra red).

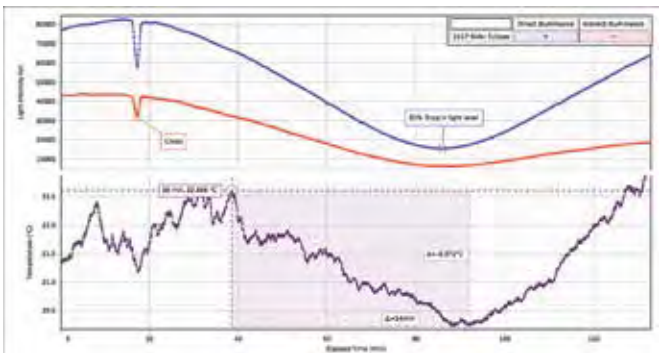
PAR (Photosynthetically Active Radiation): Amount of light in the visible range 400 -700 nm available to stimulate plant growth.

UV Index: 1 to 12 scale for the time light takes to cause skin damage. Larger numbers cause burns faster.

The spot sensor measures:

RGB: Light levels as a percent of the total of all colors measured

White: Total 'white' light intensity as a function of the sensor (on a scale of 65,536)



Order Information

Wireless Light and Color Sensor.....PS-3248

Wireless Light Sensor Pack.....PS-3338

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Geiger Counter

PS-3238

The PASCO Wireless Geiger Counter counts beta, gamma and alpha radiation particles as they enter the Geiger–Müller detector tube inside the counter. Designed for easy mounting, the Geiger Counter provides superior position control in inverse square law labs, as well as an audible beep to indicate the detection of ionizing radiation. The front plastic snout fits conveniently inside the NU-3344 Sample Holder stand (available separately), which stabilizes the front of the counter's detector tube exactly 1 cm from the first slot in the holder.

With the Wireless Geiger Counter, students can wirelessly control the high voltage supplied to the Geiger–Müller tube inside the counter, enabling them to make measurements of counts per interval for different tube voltages. They can also create a plot of counts/interval versus tube voltages to experimentally observe the Geiger plateau characteristics of the tube.

Features:

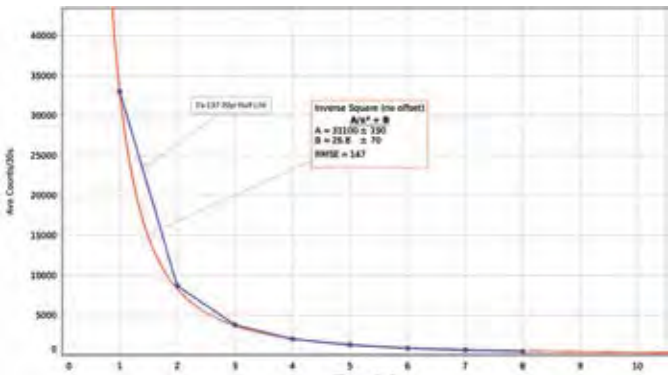
- Built-in metal mesh screen to protect the delicate mica window in the front of the Geiger–Müller detector tube
- Audible beep to indicate counts can be easily switched on or off
- **Versatile positioning options:** Use it with the NU-3344 Sample Holder, hand-held, or mount it to a rod stand
- Convenient design natively fits the PASCO NU-3344 Sample Holder
- Provides wireless control over the high voltage supplied to the Geiger–Müller tube inside the counter for Geiger plateau experiments

Specifications:

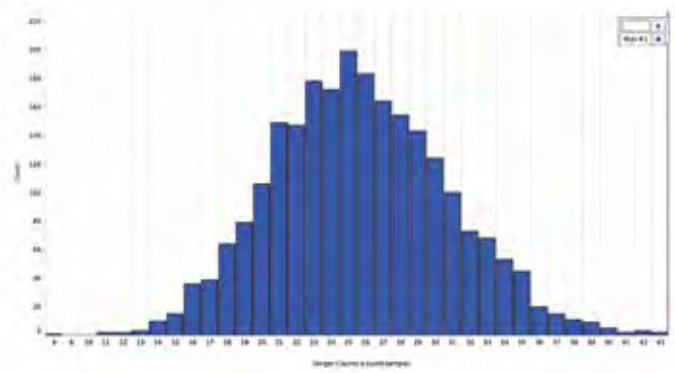
Sensitivity: Alpha, Beta, Gamma
Count Detection: Switchable audio signal
Gas Filling: Ne +Halogen
Effective Tube Diameter: 9.1 mm
Window Thickness: 1.5 to 2.0 mg/cm^2
High Voltage Control Range: 150 VDC to 650 VDC
Standard Operating Voltage: 500 VDC

Includes:

- Wireless Geiger Counter
- Micro USB Cable: PS-3584
- Threaded handle for mounting the sensor to a ring stand



Measure counts/interval from a radioactive source at various distances to explore the inverse square law.



Demonstrate the statistical (gaussian or poisson) nature of counts/interval measured from a radioactive source with a long half-life.

Stabilize samples with the optional PASCO Geiger Counter Sample Holder.

Order Information

Wireless Geiger Counter	PS-3238
Geiger Counter Sample Holder	NU-3344

Wireless Temperature Sensor

PS-3201

Welcome to the modern thermometer. The Wireless Temperature Sensor transmits live data and allows students to continuously monitor, log, and plot temperature measurements on nearly any device. When lab-time ends but the experiment continues, students can set the sensor to log data autonomously for days, weeks, or months, then download it for analysis later. This durable, wireless sensor features a stainless steel probe for the most demanding of applications, as well as a battery that lasts over a year*. It can be used in a wide array of experiments and activities because it measures small, but significant temperature changes produced by chemical reactions, convection currents, and even skin temperatures.

Order Information

Wireless Temperature Sensor.....PS-3201

Wireless Temperature Sensor Pack.....PS-3330

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless Current Sensor

PS-3212

The Wireless Current Sensor's broad current range supports a wide variety of experiments, ranging from basic circuit studies to advanced electricity labs. Designed with user safety in mind, the sensor can be used to measure currents up to 1 A and includes built-in overload protection. The collected data can be wirelessly transmitted to computers, Chromebooks, tablets, and smartphones. When paired with the Wireless Voltage Sensor, students can explore Ohm's Law, circuits in series and parallel, and much more.

Wireless Voltage Sensor

PS-3211

The Wireless Voltage Sensor is ideal for exploring the fundamental concepts of electricity, voltage, and basic circuits. Complete with built-in overload protection, this sensor measures voltages up to ±15 V and features high-speed sampling rates when connected via USB. When used with the Wireless Current Sensor, students can use it to explore Ohm's law, circuits in series and parallel, and much more.

Order Information

Wireless Current Sensor PS-3212

Wireless Voltage Sensor.....PS-3211

Note: *Multi-sensor packs with 8 sensors and custom storage case available on web.*

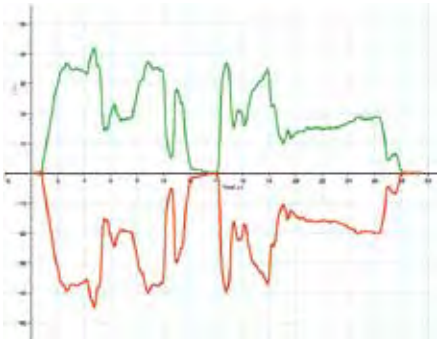
Wireless Force Acceleration Sensor

PS-3202

Capable of simultaneously measuring force, acceleration, and rotational velocity, this sensor is ideal for experiments involving rotating platforms, moving carts, spring oscillations, collisions, and impulse. The wireless design offers improved measurement accuracy by eliminating cords that affect data collection. Students can use the finger-holes for handheld applications, or mount it onto a cart or rod for more complex experiments.

Teaching Advantage:

- Bluetooth® 5.2 simple, one touch in-app pairing
- Long-lasting rechargeable battery
- Zeroing is completed within the software for accurate taring
- Logging mode stores data for force, acceleration, and rotation directly on the sensor for long-term experiments
- Simultaneously measures force and acceleration
- Built-in 3-axis acceleration sensor measures acceleration in x, y, and z axes, and calculates resultant acceleration
- Built-in gyroscope measures rotation about x, y, and z axes



The Wireless Force Acceleration Sensor is perfect for explorations of Newton's third Law.

Order Information

Wireless Force Acceleration Sensor.....PS-3202

Wireless Force Acceleration Sensor Pack.....PS-3339

Note: *Price for multi-sensor packs includes 8 sensors and custom storage case.*

Wireless 1 & 2-Axis Force Platforms

PS-3229 & PS-3230

The Wireless Force Platforms build on the success of our PASPORT Force Platforms, offering users the same reliable performance with enhanced durability and a convenient, wireless connection.

The new design features a sturdy, glass-filled nylon platform and four supporting force beams that measure the forces acting normal to the platform's surface. The Wireless 2-Axis Force Platform also includes a fifth beam for measuring forces parallel to the platform. Along the bottom of each platform are four adjustable feet that make leveling quick and easy, while also ensuring stability between the force beams and the surface below. Students can measure the force applied to each beam independently or the overall resultant force acting on the surface of the platform (up to 5200 N). With their new wireless design, the Wireless Force Platforms are easier to use than ever, providing both spacial flexibility and custom sample rates for high speed sampling over Bluetooth® (up to 10 kHz).

Features:

- Improved ruggedized design with increased maximum force range
- Mechanical force over-limit protection
- Wide top surface for jumping and standing
- Burst sampling option for high speed wireless data collection

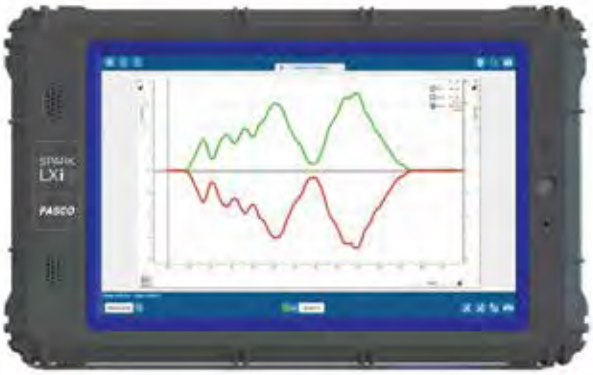
Specifications:

1-Axis Range: -1320 N to 5280 N (resultant)
2-Axis Range: -1320 N to 5280 N (resultant); ±1300 N parallel force
Surface Dimensions: 35 cm x 35 cm
Maximum Sample Rate: 10 kHz
Resolution: 0.2 N
1-Axis Force Over-Limit Protection: -500 N to 2000 N per beam
2-Axis Force Over-Limit Protection: -500 N to 2000 N per vertical beam; ±2000 N parallel beam

The 2-Axis platform measures the normal and parallel forces acting on the platform simultaneously. Determine the static weight of a structure or person, measure forces associated with the impacts of falling objects, and determine the dynamic vertical and parallel forces that arise when moving or jumping.

Order Information

Wireless Force Platform	PS-3229
Wireless 2-Axis Force Platform	PS-3230
Handle Set, Force Platform	PS-2548



SPARK LXi2 Datalogger

PS-3600B

The SPARK LXi2 Datalogger is a Bluetooth®, handheld datalogger that enables students to connect wired and wireless sensors, collect data, generate graphs, and analyze results. It is durable, splash-proof, and works seamlessly with PASCO sensors. The SPARK LXi2 can simultaneously accommodate up to five wireless sensors, includes two ports for PASPORT sensors, as well as two ports for the included Fast Response Temperature Probe and Voltage Probe. It can be used with PASCO Wireless sensors, PASPORT sensors and an AirLink, SPARKlink® Air, and the 550 Universal Interface.

Built for Student Use:

- Portable
- Shock-absorbing case
- 8" Color Capacitive Touchscreen (1280 x 800 pixels)
- 2 GHz Quad Core Processor, 2.0 GB RAM, 32 GB Memory
- Voltage and temperature sensor ports with included probes
- Wi-Fi enabled
- Wireless sensors and Smart Carts connect via Bluetooth®
- Two PASPORT sensor ports
- **Loaded with PASCO software:** SPARKvue for data collection and analysis, MatchGraph!, and Spectrometry software

The SPARK LXi2 features two PASPORT ports as well as ports for the included temperature and voltage probes.

Scan to learn more about the SPARK LXi2

Order Information

SPARK LXi2 Datalogger.....PS-3600B

550 Universal Interface

UI-5001

The 550 Universal Interface is fast, powerful, and incredibly affordable. The cost-effective 550 offers half the ports and many of the same features as our 850 Universal Interface, including both Bluetooth® and USB connectivity. The 550 Universal Interface includes two PASPORT sensor ports, two digital sensor ports, two analog sensor ports, and a built-in signal generator.

The 550's two digital inputs are compatible with all ScienceWorkshop digital sensors, as well as timing devices, and photogates. The two analog ports connect with our analog ScienceWorkshop sensors and can support a 2.0 MHz max sampling rate and 1.22 mV resolution for voltage sensing.

The 550's built-in signal generator powers motors, speakers, circuits, and many other devices. With PASCO Capstone software and the 550, you can control various DC and AC waveforms, without requiring any other technology. The 550 provides 8 V at 400 mA, selectable voltage limits, built-in voltage and current measurements, and DC offset. Capstone software turns the 550 into a live oscilloscope that can display simultaneous traces.

Beyond having USB 2.0 connectivity, the 550 can also send data wirelessly to any Bluetooth® enabled computer, iPad, or Android tablet using PASCO Capstone or SPARKvue software.

Features:

- USB and Bluetooth® connectivity
- 3.2 W power amplifier
- 2.0 MHz max sampling rate
- 100 kHz signal generator with built-in Voltage and Current sensors
- Compatible with PASPORT, ScienceWorkshop, and Wireless Sensors
- 2 high-speed analog inputs
- 2 digital inputs for photogates and other timing sensors
- 2 PASPORT sensor inputs
- Can be used simultaneously with other PASPORT interfaces
- Uses PASCO Capstone or SPARKvue Software

The 550 Universal Interface allows you to connect Science Workshop (analog), PASPORT (USB), and Wireless (Bluetooth®) sensors. It also includes a power amplifier and signal generator (not shown).

Order Information

550 Universal Interface.....UI-5001

Interface Comparison

Compare the features and capabilities to see which interface is best for your lab.

	SPARK LXi2 PS-3600B	AirLink PS-3200	SPARKlink Air PS-2011	550 Universal Interface UI-5001
PASPORT Ports	2	1	2	2
Analog Inputs	0	0	0	2 (±10 V, optional gain voltage 10x, 100x)
Digital Inputs	5	0	0	2
Connects via USB	Yes	Yes	Yes	Yes
Connects via Bluetooth®	Yes	Yes	Yes	Yes
Rechargeable Battery (for cordless operation only)	Yes	Yes	Yes	No (AC adapter)
Works with PASCO Capstone Software	No	Yes	Yes	Yes
Works with SPARKvue Software	Yes	Yes	Yes	Yes
Accepts PASPORT Sensors	Yes	Yes	Yes	Yes
Accepts ScienceWorkshop Sensors	No*	No*	No*	Yes
Maximum Sampling Rate	Sensor dependent <100 kHz	Sensor dependent <1000 Hz	Sensor dependent <1000 Hz	Up to 2 MHz on one channel
Signal Generator	N/A	N/A	N/A	±8 V, at 400 mA, DC to 100 kHz
Included Items	Ruggedized case, hands-free stand, SPARKvue, MatchGraph!, Spectrometry	USB Cable	AC adapter, USB cable, fast response temperature and voltage probe	USB cable, Power supply

* The AirLink and SPARKlink Air can accept most ScienceWorkshop sensors with the proper adapter, although they won't have the same high maximum sample rates. One exception is the Sound Sensor (UI-5101), which is not recommended for use with an adapter.

AirLink Interface

PS-3200

The AirLink connects PASPORT sensors to a Mac® or Windows® computer, Chromebook, iPad, tablet, or smartphone via Bluetooth® or USB connection. The USB cable is included.

Order Information

AirLink Interface PS-3200

SPARKlink Air Interface

PS-2011

The SPARKlink® Air allows students and teachers to connect any of our 70+ PASPORT sensors to their device via USB or Bluetooth®.

Order Information

SPARKlink Air Interface PS-2011

Make the switch to PASCO capstone™ 2

The Most Advanced Data Collection Software in Science Education

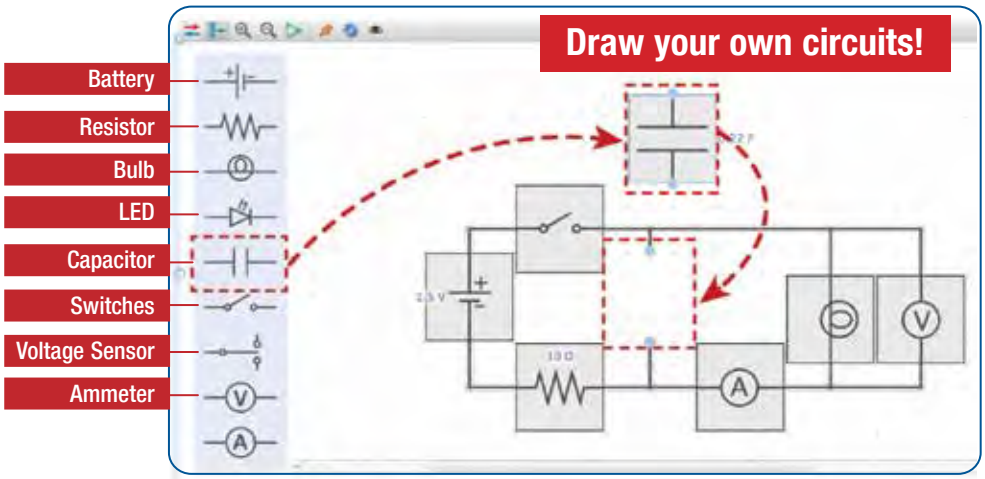
PASCO is pushing the limits of technology, so you can push your students to their potential. Working closely with educators, we continuously develop Capstone, making improvements and enhancing the teaching features. Capstone is designed to handle large data sets, high-speed sampling, and customized preferences to fit the needs of your lab. The straightforward user interface is approachable for beginners, yet Capstone offers all the capabilities needed for even the most advanced users.

Features in PASCO Capstone 2

Visit **pasco.com/capstone** for more information.

Circuits Emulation

Reinforce circuit concepts and tackle student misconceptions using circuit visualization.

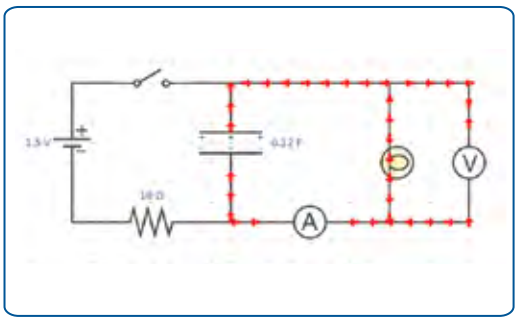


Combine real-world circuits with simulations, animations, and live measurements.

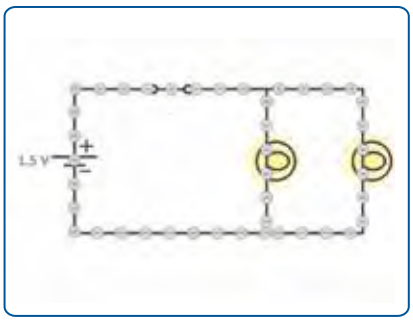
With this tool you can:

- Construct and modify circuits
- Show conventional current and electron flow animations
- Animate circuits with live sensor data
- Build your own circuits in Capstone, drag and drop components, and draw wires to connect them
- Demonstrate series and parallel
- Charge and discharge capacitors

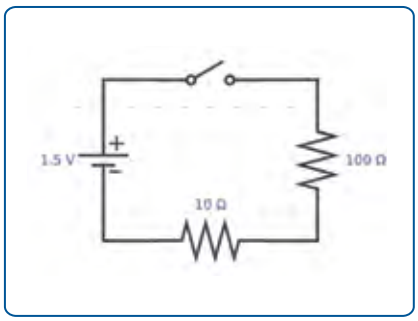
Examples of other circuit emulations



- Animate conventional current flow
- Animate a capacitor—charge or discharge
- Edit capacitor values



- Animate electron flow
- Connect components in parallel or series



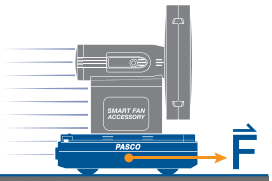
- Operate switches
- Edit voltage and resistor values

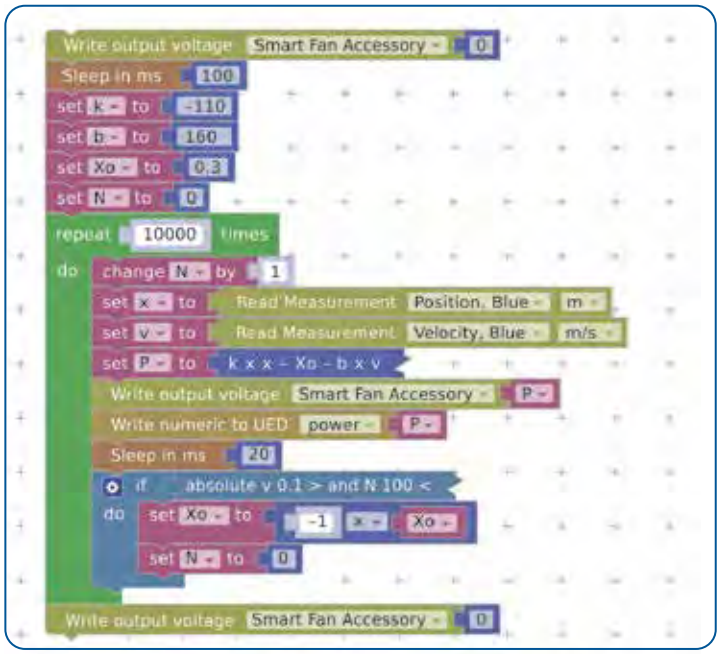
800.772.8700 (inside US) +1 916.786.3800 (outside US)

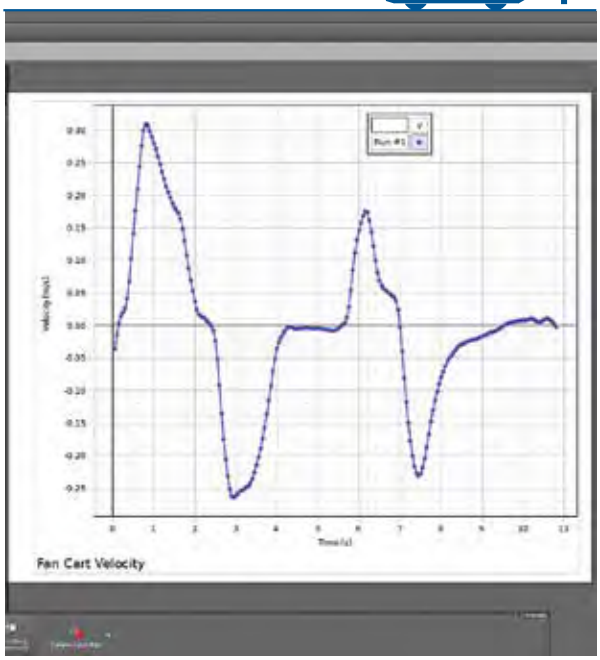
Blockly Block-based Coding

- Control all PASCO sensors and interfaces
- Create sense and control programs
- Control outputs from sensor inputs

Bring computational thinking into your science lab!



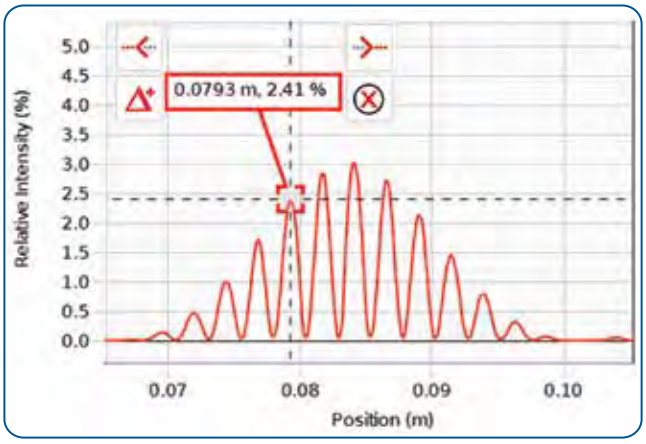




Visit **pasco.com/capstone** for more information.

Graph Pop-up Tools

Quick access to commonly used analysis tools



Capstone has all the software tools you need for data collection and analysis. And we continue to add more features, based on input from physics educators just like you!

- Exclude or delete selected data points from analysis
- Create models using the calculator
- Calculated columns in tables
- Error bars
- Weighted linear fit that takes error bars into account
- More complex curve fits such as damped sine, Gaussian, sine series, and user-entered fits
- Smooth data directly on a graph with slider tool
- Global preferences settings

Download the Free Trial
www.pasco.com/Capstone
Available for Mac® and Windows®

Order Information

PASCO Capstone
Site License ..... UI-5400 or UI-5400-DIG

TOOLS

Configure PASCO Hardware
Works with PASPORT, ScienceWorkshop, and Wireless Sensors

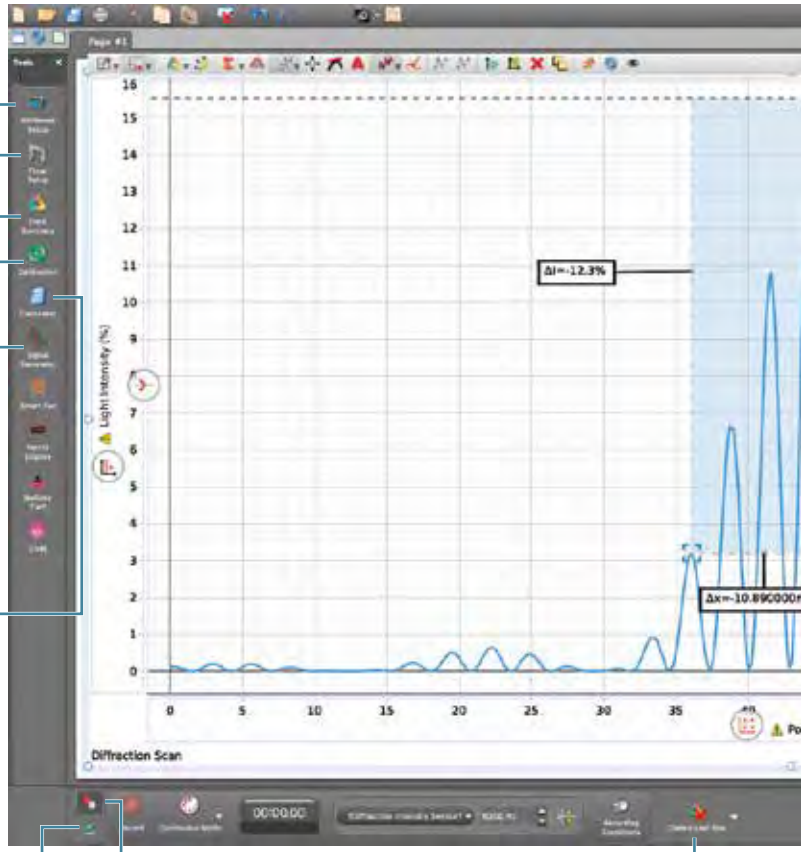
Photogate Timer Wizard
Easily configure photogates and timing measurements

Data Summary
- Equations/calculations
- Fundamental constants
- Experimental constants
- Trials and runs

Sensor Calibration Wizard
- Step by step calibration
- Many calibration types

Signal Generator
- Scan through a range of frequencies
- Control signal output with a calculation

Calculator
- Graph modeling
- Create data sets using sensor data

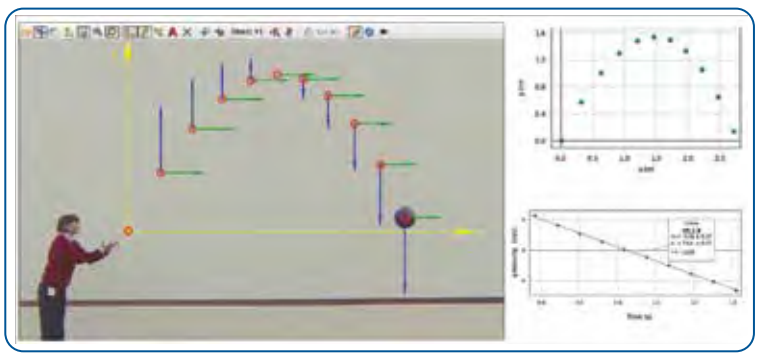


Sophisticated scientific calculator has statistics, calculus, filters, logic functions, and special operations such as amplitude and period.

Replay Your Data
- Change replay rate
- Increment by frame
- Loop playback

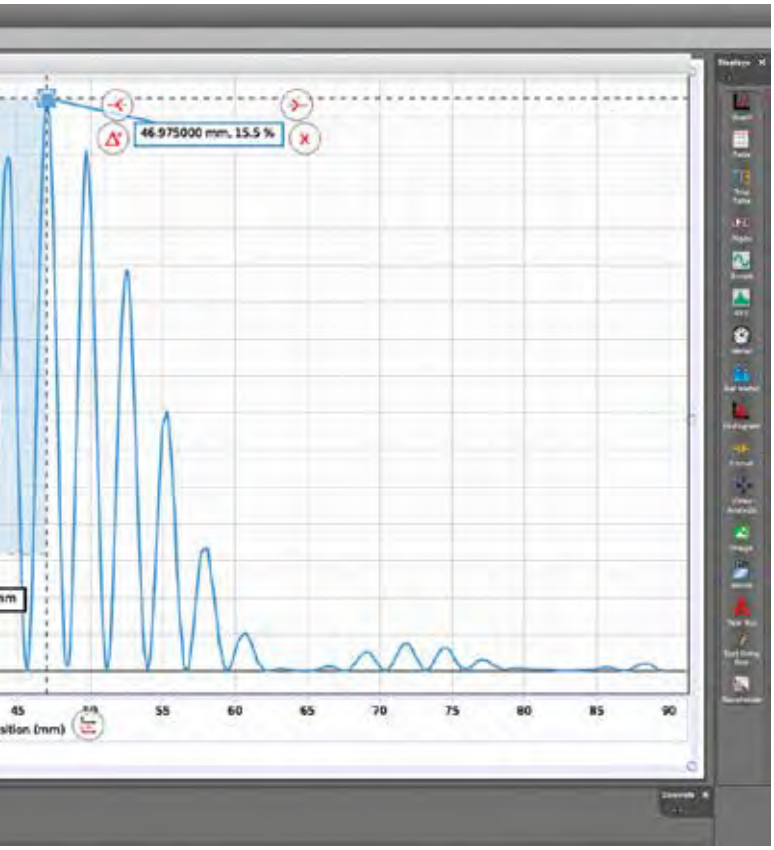
Sampling Options
- Continuous manual sampling
- Fast monitor mode
- Independent sensor sampling rates
- Start/stop conditions
- Zero sensor

Capstone 2 Includes Video Analysis



Import video and analyze the motion of objects to measure position, velocity, and acceleration. With this tool you can also:
- Show velocity and acceleration vectors
- Use magnifier to identify exact center of an object
- Use calibration ruler at any time
- And so much more!

PASCO's proximity in-app sensor pairing: U.S. Patent Number 10,356,594



DISPLAYS

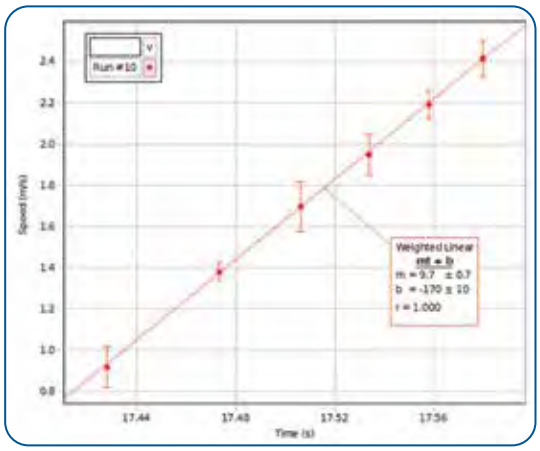
Display *Your* Data *Your* Way

• Graph • Table • Digits • Scope • FFT • Meters

Graph Tools Include

- Draw predictions on graphs before taking data
- Multiple *y*-axes and/or multiple plot areas
- Perform Quick-Calcs on the graph axis to linearize data
- Curve-fits report the uncertainties in the parameters
- Multi-coordinate tool gives *y*-values wherever it intersects data

Error Bars and Weighted Linear Fits



Graph uncertainties using user-entered error bars, absolute error, or percent error. The weighted linear fit incorporates the error bars.

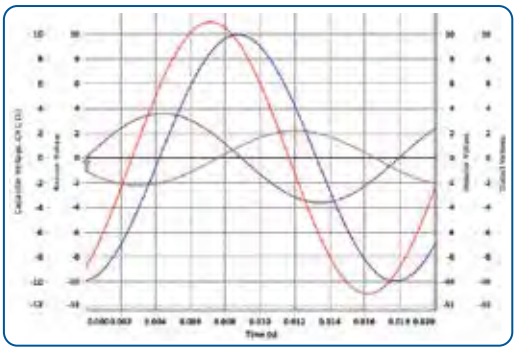
Visit **pasco.com/capstone** for more information.

Delete Runs

- Last run only
- Select from list
- All runs

Made a mistake?
Just hit
UNDO

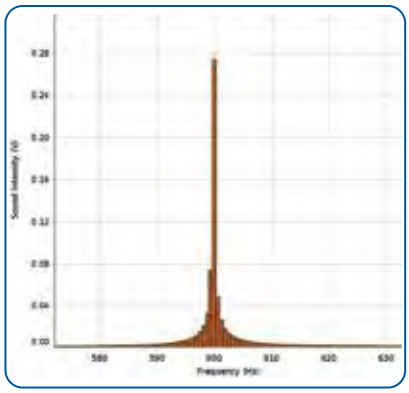
Oscilloscope Display



This display behaves like an authentic digital oscilloscope.

- Trigger
- Single trace collection
- Sample rate tied to time axis scale
- Set trace offset

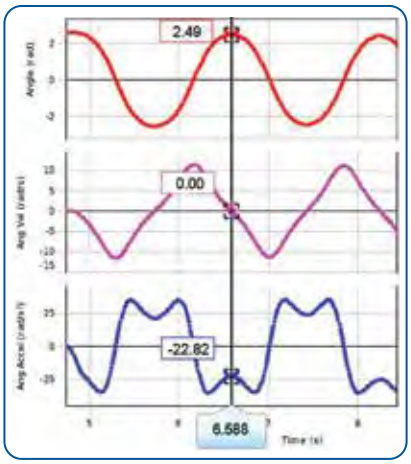
FFT



Display data in the frequency domain to find peak frequency and harmonics.

- Sample rate tied to axis scale
- Normalize data
- Adjust BIN width

Multi-Coordinate Tool



Easily show the relationship between multiple data plots by comparing data values across the time axis.

Sensor Index

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Classroom Sensor Multi-Packs

The Wireless Sensor Packs contain 8 Wireless Sensors inside a Gratnells storage tray. Also inside the tray is a custom insert designed to securely fit each sensor. The trays provide a convenient and well-ordered storage solution for any classroom, while also making transportation between classrooms effortless.

MP +8

Look for this symbol on sensors available in multi-packs

Wireless Acceleration/Altimeter

PS-3223

Specifications:

Low-g Accelerometer:
Range: ±16 g
Resolution: 0.002 g at 20 Hz
Accuracy: ±0.04 g
Maximum Sample Rate: 5 kHz

High-g Accelerometer:
Ranges: ±100 g, ±200 g, ±400 g
Resolution: 0.04 g (@ ±100 g) at 20 Hz
Accuracy: ±1 g (@ ±100 g)
Maximum Sample Rate: 5 kHz

Altimeter:
Range: -1.8 km to 9.5 km
Resolution: 10 cm
Maximum Sample Rate: 200 Hz

Gyroscope:
Range: ±34.9 rad/s
Accuracy: ±0.02 rad/s
Maximum Sample Rate: 1 kHz

Connectivity: Bluetooth 5.2
Logging: Yes
Battery Type: Coin Cell

Order Information

Wireless Acceleration/Altimeter.....PS-3223

Wireless Blood Pressure Sensor - Standard Cuff

PS-3218

Specifications:

Heart Rate
Range: 36 to 200 bpm
Resolution: 1 bpm
Accuracy: ±1 bpm

Blood Pressure
Range: 0 to 260 mmHg
Resolution: 0.05 mmHg
Accuracy: ±3 mmHg

Gauge Pressure
Range: 0 to 260 mmHg
Resolution: 0.05 mmHg
Accuracy: ±3 mmHg

Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Blood Pressure Sensor with Standard Cuff..... PS-3218

Wireless CO_2 Sensor (Carbon Dioxide)

PS-3208

Specifications:

Range: 0 to 100,000 ppm
Resolution: 2 ppm
Accuracy: 1,000 – 10,000 ppm Range: ±5% of reading + 100ppm, 10,000 – 50,000 ppm Range: ±10% of reading, 50,000 – 100,000 ppm Range: ±15% of reading
Warm-up Time: 3 min
Response Time: 90% in 30 sec
Operating Temperature Range: -10°C–50°C (5°C to 30°C ideal for LiPo charging)
Metabolism Bottle Volume: 250 mL
Metabolism Bottle Care: Warm soapy water (not boiling)
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless CO_2 Sensor (Carbon Dioxide) PS-3208

//code.Node

PS-3231

Specifications:

Light Level Sensor Range: 600 lx to 50,000 lx (not calibrated)

Sound Level Sensor Range: 70 to 100 dB (not calibrated)

Magnetic Field Sensor Range: ±50 gauss

Acceleration Sensor Range: ±8 g

Ambient Temperature
Range: -25°C to 40°C
Resolution: 0.05°C
Accuracy: ±1°C

Speaker Frequency Range:
10 Hz to 10,000 Hz
Maximum Sample Rate: 100 Hz
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

//code.Node PS-3231

Wireless Colorimeter & Turbidity Sensor

PS-3215

Specifications:

Color Detection/Peak Wavelengths: 650 nm (red), 600 nm (orange), 570 nm (yellow), 550 nm (green), 500 nm (blue), 450 nm (violet)
Detection Wavelength Range: ±25 nm from peak
Absorbance: 0–3 Abs units; useful range (0.05–1.5 Abs)
Transmittance: 0-100%
Turbidity Illumination Wavelength: 850 nm
Turbidity Range: 0-400 NTU
Accuracy: ±5% NTU
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Colorimeter & Turbidity Sensor.....PS-3215

Wireless Conductivity Sensor

PS-3210A

Specifications:

Range: 0 to 40,000 µS/cm (0 to 28,000 mg/L TDS)
Resolution: 0.1 µS/cm
Accuracy (200 - 40,000): ±5% of value
Accuracy (below 200): ±25 %

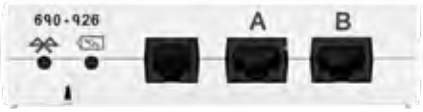
Total Dissolved Solids:
Range: 0 to 30,000 ppm
Resolution: 0.1 ppm
Accuracy: 10% between 100–30,000 ppm
Response Time: 95% of in 5 seconds
Environmental Tolerance: 0 to 80°C
Temperature Compensation: 0 to 35°C
Temperature Accuracy: ±0.5°C
Waterproof: IPX7 rated (1 meter for 30 min)
Connectivity: Bluetooth 5.2
Logging: Yes
Battery Type: Coin Cell

Order Information

Wireless Conductivity Sensor PS-3210A

//control.Node

PS-3232



Specifications:

Power Output Ports:
±5 VDC, 0.7 A
Auto-ID stepper motors and Power Output Module
8-pin modular jack

Product Servo Ports: Accepts standard servos and continuous rotation servos, 3-pin connector, Built-in servo current sensor for detecting load, and I2C

Sensor Port: 6-pin modular jack
Acceleration Sensor: ±16g, 3-axis
Speaker Frequency Range: 10 Hz to 10,000 Hz
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

//control.Node.....PS-3232

Wireless Current Sensor

PS-3212

Specifications:

High Current:
Range: ±1 A
Resolution: 0.2 mA

Low Current:
Range: ±0.1 A
Resolution: 0.02mA

Input Resistance: 0.1 Ω
Maximum Sample Rate: 100 kHz
Connectivity: USB or Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Current Sensor PS-3212

Wireless Drop Counter

PS-3214

Specifications:

Range: 0 to 40 drops/second
Accuracy: ±1 drop
Resolution: 1 drop
Optical Window: Acrylic
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Drop Counter PS-3214

Wireless EKG Sensor

PS-3236

Specifications:

Voltage Range: 0 to 4.5 mV
Voltage Resolution: 5 µV
Default Sample Rate: 250 Hz
Maximum Sample Rate: 1000 Hz
Heart Rate Range: 40 to 250 bpm
Accuracy: ±1 bpm
Connectivity: USB and Bluetooth 5.2
Battery Type: Rechargeable LiPo
Logging: Yes

Order Information

Wireless EKG Sensor.....PS-3236

Wireless Exercise Heart Rate Sensor

PS-3207

Specifications:

Approximate mass, strap and connector: 40 grams
Sensor Range: 0 to 240 beats per minute
Accuracy: ±1 beat per minute
Resolution: 1 bpm
Maximum Sample Rate: Every two seconds
Default Sample Rate: Every five seconds
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery: Coin Cell

Order Information

Wireless Exercise Heart Rate Sensor.....PS-3207

Wireless 2-Axis Force Platform

PS-3230

Specifications:

Force Range: -1320 N to 5280 N (resultant)
Parallel Force Range: ±1,300 N
Resolution: 0.2 N
Maximum Sample Rate: 10 kHz
Force Over-Limit Protection: -500 N to 2000 N per vertical beam; ±2,000 N parallel beam
Dimensions: 35 x 35 x 7.1 cm
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type:
Rechargeable LiPo

Order Information

Wireless 2-Axis Force Platform PS-3230

Wireless Force Platform

PS-3229

Specifications:

Range: -1320 to 5280 N (resultant)
Resolution: 0.2 N
Maximum Sample Rate: 10 kHz
Surface Dimensions: 35 x 35 cm
Force Over-Limit Protection: -500 to 2000 N per beam
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Force Platform PS-3229

Wireless Force Acceleration Sensor

PS-3202

Specifications:

Force Sensor:
Range: ±50 N
Resolution: 0.03 N
Accuracy: 0.1 N
Maximum Sample Rate: 1000 Hz

Accelerometer:
Range: ±16 g
Accuracy: ± 0.2 m/s^2 (at 9.8 m/s^2)
Maximum Sample Rate: 500 Hz

Gyro Sensor:
Range: ±2000 °/s
Maximum Sample Rate: 500 Hz

Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Force Acceleration Sensor PS-3202

Wireless Geiger Counter

PS-3238

Specifications:

Sensitivity: Alpha, Beta, Gamma
Count Detection: Switchable audio signal
Gas Filling: Ne +Halogen
Effective Tube Diameter: 9.1 mm
Window Thickness: 1.5 to 2.0 mg/cm^2
High Voltage Control Range: 150 VDC to 650 VDC
Standard Operating Voltage: 500 VDC
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery: Rechargeable LiPo

Order Information

Wireless Geiger Counter.....PS-3238

Greenhouse Sensor

PS-3322

Specifications:

Operating Temperature: -40°C to 80°C

Light Level Sensor:
Wavelength Range: Visible Spectrum (400 nm to 700 nm)
Sensitivity Range: Approximately 600 lx to 50,000 lx (not calibrated)
Resolution: 0.1%
Accuracy: 5%
Report out: 0 to 100% of max reading

Ambient Temperature:
Range: -40°C to 80°C
Resolution: 0.01°C
Accuracy: ±0.5°C

Humidity Sensor:
Range: 0 to 95% non condensing
Resolution: ±0.02%
Accuracy: ±3%

Temp, Light, Humidity Sensors:
Power Use: 0.98 mA at 3.3 V DC

Soil Moisture Sensor:
Range: 0 to 45%
Resolution: 0.1%
Accuracy: ±5%
Probe Cable Length: 2 m
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Coin Cell

Order Information

Greenhouse Sensor.....PS-3322

Wireless Hand-Grip Heart Rate Sensor

PS-3206

Specifications:

Range: 0 to 240 bpm
Resolution: 1 beat
Accuracy: ± 1 bpm
Maximum Sample Rate: Every two seconds
Default Sample Rate: Every five seconds
Connectivity: Bluetooth 5.2
Logging: No
Battery: Coin Cell

Order Information

Wireless Hand-Grip Heart Rate Sensor PS-3206

Wireless Light & Color Sensor

PS-3248

MP +8

Specifications:

Spectral Response: 340 nm to 1150 nm
Illuminance Range: 0 to 131,000 lux
Irradiance Range: 0 to 1362 W/m^2
PAR Range: 0 to 2400 µmol/m^2/s
UV Index Range: 0 to 12 (typical in daylight)
RGB Range: 0 to 100% of clear LED response
Maximum Sample Rate: 2 Hz (ambient); 20 Hz (spot)
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Coin Cell

Order Information

Wireless Light and Color Sensor.....PS-3248

Wireless Load Cell and Accelerometer

PS-3216

Specifications:

Force Sensor:
Range: ±50 N
Resolution: 0.03 N
Accuracy: ±0.1 N
Maximum Sample Rate: 2 kHz

Accelerometer:
Range: ±16 g (three-axis)
Maximum Sample Rate: 500 Hz
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Load Cell and Accelerometer PS-3216

Wireless Magnetic Field Sensor

PS-3221

Specifications:

High Magnetic Field:
Range: ±1300 G
Resolution: ±1 G

Low Magnetic Field:
Range: ±50 G
Resolution: ±0.01 G

Maximum Sample Rate: 100 Hz
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Magnetic Field Sensor PS-3221

Melting Point Apparatus

PS-3239

NEW

Specifications:

Temperature:
Range: 0 to 380 °C
Accuracy: 1.0 °C out of box, 0.1 °C if calibrated

Maximum Sample Rate: 1 Hz
Viewing Lens: 3x
Connectivity: Bluetooth 5.2 (for temperature data)
Camera (sold separately) Connectivity: USB
Logging: No
Battery: No

Order Information

Melting Point Apparatus.....PS-3239

Wireless Motion Sensor

PS-3219

MP +8

Specifications:

Range: 0.15 to 4 m
Resolution: 1 mm
Maximum Sample Rate: 250 Hz
Transducer Rotation Range: 180°
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Motion Sensor PS-3219

Wireless Optical Dissolved Oxygen Sensor

PS-3246

NEW

Specifications:

Range: 0 to 20 mg/L, 0 to 300% saturation
Resolution: 0.01 mg/L
Accuracy (with calibration): ±0.2 mg/L or 1% (whichever is greater)
Accuracy (out of the box): ±0.5 mg/L or 3% (whichever is greater)
Response Time: 90% in 20 sec
Measurements: Concentration (mg/L), Saturation (%), O_2 Gas (in air, qualitative) (%), Temperature (˚C)
Waterproof Depth (probe): 2.5 m
Cable Length: 3.0 m
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Optical Dissolved Oxygen Sensor (NEW!)PS-3246

Wireless Oxygen Gas Sensor

PS-3217

Specifications:

Range: 0–100% O_2 concentration; 0–1,000,000 ppm
Resolution: 0.01% oxygen
Accuracy: ±1% O_2 at constant temperature and pressure; ±5% O_2 outside operating range
Operating Temperature Range: 0–40°C
Relative Humidity Range: 0–100% (non-condensing)
Sensing Element Lifespan: 2+ years
Pressure Range: 0.7 - 1.3 atm
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Oxygen Gas Sensor.....PS-3217

Wireless pH Sensor

PS-3204

Specifications:

Range: 0-14 pH
Resolution: 0.02 pH
Accuracy: ±0.1 pH with calibration
Temperature Range: 5˚C to 60˚C
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Coin Cell

MP +8

Order Information

Wireless pH Sensor.....PS-3204

Wireless Polarimeter

PS-3237

Specifications:

Optical Rotation Accuracy: ±0.09°
Cell Length (horizontal): 101 mm ± 0.6 mm
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Polarimeter.....PS-3237

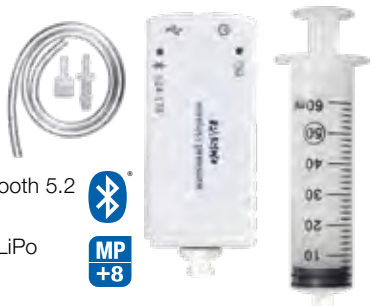
Wireless Pressure Sensor

PS-3203

Specifications:

Range: 0-400 kPa
Resolution: 0.1 kPa
Accuracy: ±2 kPa
Max Sample Rate: 1000 Hz
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

MP +8



Order Information

Wireless Pressure Sensor PS-3203

Wireless Rotary Motion Sensor

PS-3220

Specifications:

Angular Resolution: 0.18° (0.00314 radian)
Linear Resolution: 0.0157 mm (with 10 nm pulley radius)
Three-Step Pulley: 10, 29, and 48 mm diameter
Shaft Diameter: 6.35 mm
Maximum Rotation Rate: 30 revolutions per second
Optical Encoder: 2000 divisions/rev, bidirectional
Connectivity: USB or Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Rotary Motion Sensor PS-3220

Wireless Smart Gate

PS-3225

Specifications:

Gate Separation: 1.5 cm
Timing Resolution: 3 ms
Minimum Block Time: 1.5 ms
Beam Wavelength: 940 nm
Gate Inside Width: 7.2 cm
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Smart Gate PS-3225

Smart Cart Charging Garage

ME-1243

Charge up to five Smart Carts at once. Provides storage for the carts and accessory bumpers. Includes power adapter.

Order Information

Smart Cart Charging Garage ME-1243

Smart Cart (Red)

ME-1240

Specifications:

Optical Encoder:
Range: ±3.0 m/s
Resolution: ±0.2 mm
Maximum Sample Rate: 500 Hz

Accelerometer: Range: ±16 g
Accuracy: ± 0.2 m/s^2 at 9.8 m/s^2
Maximum Sample Rate: 500 Hz

Force Sensor:
Range: ±100 N
Resolution: 0.1 N
Accuracy: ±1.0%
Maximum Sample Rate: 2 kHz

Gyro Sensor:
Range: ±245 °/s
Maximum Sample Rate: 500 Hz

Patent No.: 10481173
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Smart Cart (Red) ME-1240

Smart Cart (Blue)

ME-1241

Specifications:

Optical Encoder:
Range: ±3.0 m/s
Resolution: ±0.2 mm
Maximum Sample Rate: 500 Hz

Accelerometer: Range: ±16 g
Accuracy: ± 0.2 m/s^2 at 9.8 m/s^2
Maximum Sample Rate: 500 Hz

Force Sensor:
Range: ±100 N
Resolution: 0.1 N
Accuracy: ±1.0%
Maximum Sample Rate: 2 kHz

Gyro Sensor:
Range: ±245 °/s
Maximum Sample Rate: 500 Hz

Patent No.: 10481173
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Smart Cart (Blue) ME-1241

Wireless Soil Moisture Sensor

PS-3228

Specifications:

Range: 0 to 45% water by volume
Accuracy: ±5% water by volume
Resolution: 0.1%
Power: 3 mA at 5 VDC
Operating Temperatures: -40 to 60°C
Probe Cable Length: 2 m
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Soil Moisture Sensor.....PS-3228

Wireless Sound Sensor

PS-3227

Specifications:

Microphone Frequency Range: 100 to 20,000 Hz
Sound Wave Maximum Sample Rate: 100 kHz
Sound Level Range: 50 to 110 dB
Accuracy: ±2 dB
Response: A or C weighted
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Sound Sensor PS-3227

Wireless Spectrometer (VIS)

PS-2600

Specifications:

Resolution: 2nm to 3nm FWHM
Detection Range: 380–950 nm
Fluorescence Excitation Wavelengths: 405 nm and 500 nm
Light Source: LED-boosted tungsten
Connectivity: USB and Bluetooth 5.2
Logging: No
Battery Type: Rechargeable LiPo

Order Information

Wireless Spectrometer (Vis) PS-2600A

Wireless Spirometer

PS-3234

Specifications:

Maximum Sample Rate: 1 kHz
Maximum Flow Rate: ±14 L/s
Flow Resolution: 0.01 L/s
Per Breath Volume: 10 L
Volume Resolution: 0.04 L
Prefilter Material: Low flow resistance microbial filter
Standard of cross contamination: Exceeds all ATS/ERS
Cross contamination efficiency: 99.999%
Prefilter meets ATS standards for air resistance: 0.845 mbar/L/Sec at 14/L/Sec
Mouth piece resistance: 0.2 mbar /L/Sec at 12 l/s
Prefilter dead space: 69 ml
Mouth piece dead space: 31 ml
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Spirometer.....PS-3234

Wireless Temperature Sensor

PS-3201

Specifications:

Range: -40 to 125°C
Resolution: 0.01°C
Accuracy: 0.5°C
Maximum Sample Rate: 10 Hz
Connectivity: Bluetooth 5.2
Logging: Yes
Battery: Coin Cell

Order Information

Wireless Temperature Sensor.....PS-3201

Wireless Temperature Sensor Link

PS-3222

Specifications:

Battery life: >1 year
Compatible Temperature Probes: Skin/Surface (PS-2131); Fast Response (PS-2135); Stainless Steel (PS-2153)
Range with included probe: -35 to 135°C
Resolution: ±0.05°C
Maximum Sample Rate: 20 Hz
Connectivity: Bluetooth 5.2
Jack: 3.5 mm stereo
Accuracy: ±0.5°C
Logging: Yes
Battery Type: Coin Cell

Order Information

Wireless Temperature Sensor Link.....PS-3222

Wireless Voltage Sensor

PS-3211

Specifications:

Low Voltage:
Range: ±5 V
Resolution: 2 mV

High Voltage:
Range: ±15 V
Resolution: 7 mV

Accuracy: ±1.0%
Maximum Sample Rate: 100 kHz
Input Resistance: 1 MΩ
Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Order Information

Wireless Voltage Sensor.....PS-3211

Wireless Weather Sensor with GPS

PS-3209

Specifications:

Water-resistant: Splash proof and designed to withstand the elements

Barometric Pressure:
Range: 225 to 825 mmHg
Resolution: 0.02 mmHg
Accuracy: ± 0.1 mmHg

Ambient Temperature:
Range: -40 to 125°C
Resolution: 0.1°C
Accuracy: ± 0.2°C

Wind Speed:
Range: 0.5 to 15 m/s (winds up to ~ 33 mph)
Resolution: 0.1 m/s
Accuracy: 3% of reading

Relative Humidity:
Range: 0 - 100%
Resolution: 0.1%

Illuminance Range (Light Level): 0 to 130,000 lux
PAR Range (Based on Solar Radiance): 0 to 2400 µmol/m^2/s
Irradiance Range (Based on Solar Radiance): 0 to 1362 W/m^2

UV Index:
Range: 1 to 12
Resolution: 1
Accuracy: ±1

Position (via GPS):
Range: ±90 Lat, ±180 Lon
Resolution: 0.00001°
Accuracy: ±0.00005° ~3m (50% CEP)

Altitude (via GPS):
Range: 0 to 18,000 m
Resolution: 0.5 m
Accuracy: ~ 5 m (50% CEP)

Speed (via GPS):
Range: 0 to 515 m/s
Resolution: 0.05 m/s
Accuracy: 0.05 m/s

Operating Environment (Temperature): -20 to 150°C
Operating Environment (Max Wind Speed): 65 mph

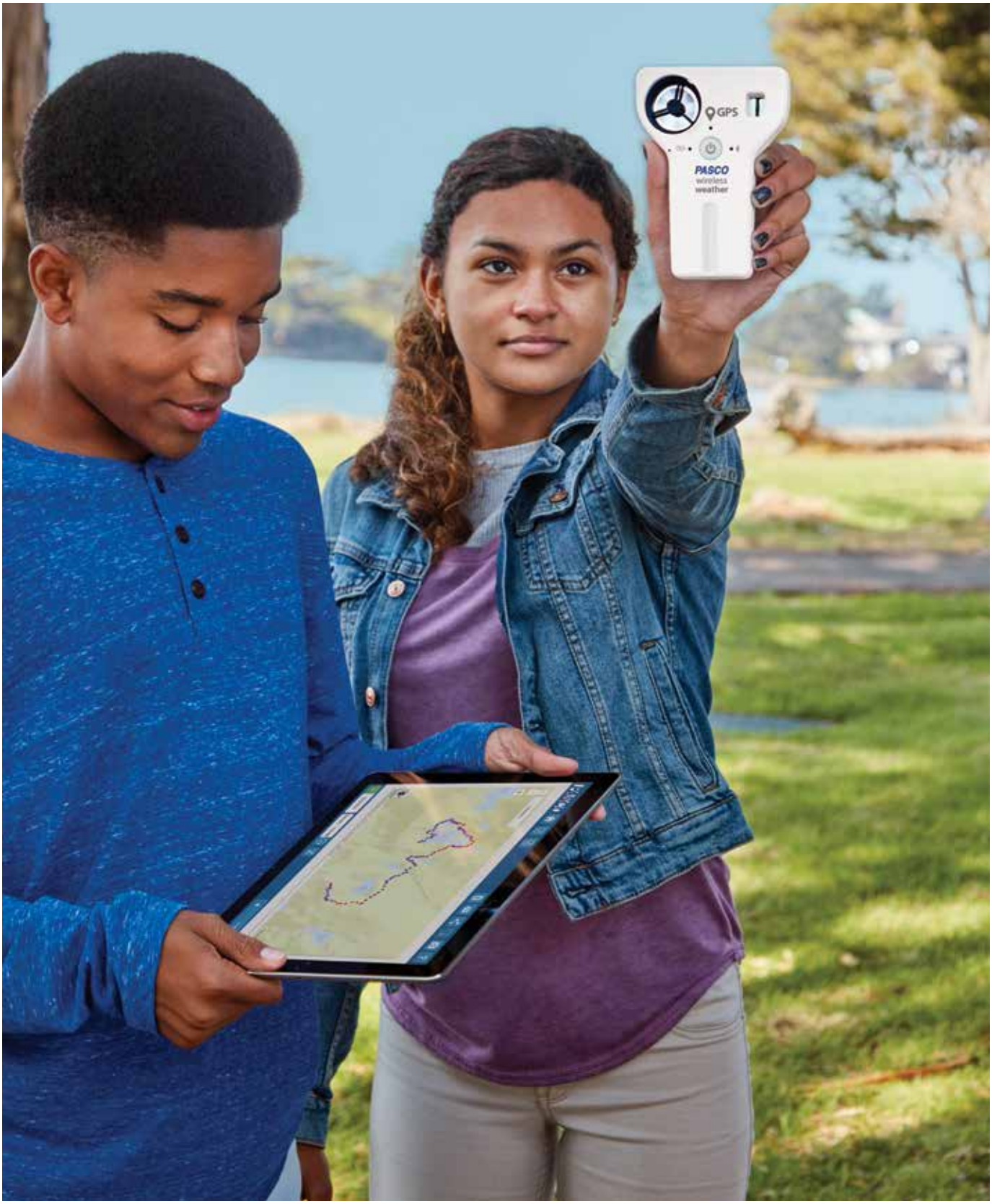
GPS Channels: 66
GPS Warm Up Time: 35 seconds or less

Connectivity: USB and Bluetooth 5.2
Logging: Yes
Battery Type: Rechargeable LiPo

Tripod and weather vane sold separately

Order Information

Wireless Weather Sensor with GPS PS-3209


GPS
PASCO
wireless
weather

PASPORT Sensor Guide

For product details, including availability and compatibility with other PASCO products, please visit **pasco.com/products/sensors/pasport**

PASPORT Breath Rate Sensor
PS-2187

PASPORT Charge Sensor
PS-2132

PASPORT Displacement Sensor
PS-2204

PASPORT EKG Sensor
PS-2111

PASPORT Ethanol Sensor
PS-2194

PASPORT Flow Rate/ Temperature Sensor
PS-2130

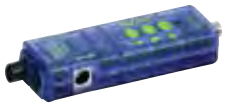
PASPORT Force Sensor
PS-2104

PASPORT High Resolution Force Sensor
PS-2189

PASPORT Force Platform
PS-2141

PASPORT 2-Axis Force Platform
PS-2142

PASPORT Galvanometer
PS-2160



PASPORT General Science Sensor
PS-2168

PASPORT Goniometer Sensor
PS-2137

PASPORT Broad Spectrum Light Sensor
PS-2150

PASPORT High Sensitivity Light Sensor
PS-2176

PASPORT Infrared Light Sensor
PS-2148

PASPORT Load Cell and Dual Amplifier Set
PS-2206

PASPORT 2-Axis Magnetic Field Sensor
PS-2162

PASPORT Motion Sensor

PS-2103A

PASPORT Rotary Motion Sensor

PS-2120A

Smart Gate

PS-2180

PASPORT Salinity Sensor

PS-2195

PASPORT Soil Moisture Sensor

PS-2163

PASPORT Spirometer

PS-2152

PASPORT Fast Response Temperature Probe (3 Pack)

PS-2135

PASPORT Skin/Surface Temperature Probe

PS-2131

AirLink Interface

PS-3200

The AirLink Interface connects PASPORT sensors to a computer, tablet or smartphone via Bluetooth or USB connection.

PASPORT Stainless Steel Temperature Probe

PS-2153

PASPORT Non-Contact Temperature Sensor

PS-2197

PASPORT Thermocline Sensor

PS-2151

PASPORT Dual Pressure Sensor

PS-2181

PASPORT Water Quality Colorimeter

PS-2179

PASPORT Analog Adapter

PS-2158

PASPORT Digital Adapter

PS-2159

Gratnells® Rolling Carts - Convenient Mobile Storage

EP-3574 (2-column) EP-3575 (3-column)

Gratnells® Rolling Cart (2- or 3-column)

EP-3574 / EP-3575

Gratnells Rolling Carts are the best way to store and transport PASCO sensors and equipment. They can be configured for trays of any size and include large castors with brakes for added stability.

Designed for Gratnells trays, these movable storage rack carts can store up to 8 (2-column) or 12 (3-column) Gratnells F2 trays (sold separately). Each cart comes with either 16 or 24 pairs of runners.

They can be used to store the equipment kits from the Essential Physics or Essential Chemistry curriculum, the storage trays we offer for wireless sensors, or any of the four sizes of empty trays that we offer for everything else you'd like to store.

Assembly is required. Trays not included.

Stores up to 12 Gratnells F2 trays

Dimensions: 107 cm high, 102 cm wide, 43.5 cm deep

Stores up to 8 Gratnells F2 trays

Dimensions: 107 cm high, 70 cm wide, 43.5 cm deep

Order Information

Gratnells Rolling Cart (2-column) EP-3574

Gratnells Rolling Cart (3-column) EP-3575

Wireless Sensor Storage Trays with Lids

Each F1 storage tray (below) holds up to ten sensors; **sensors sold separately**.

Temperature/pH/ Conductivity Sensors
PS-3585

Pressure Sensors
PS-3586

Colorimeter & Turbidity Sensors
PS-3587

Voltage & Current Sensors
PS-3588

Motion Sensors
PS-3589

AirLink & Light Sensors
PS-3594

Force Acceleration Sensors
PS-3595

Weather Sensor with GPS
PS-3596

CO_2 Sensor
PS-3598

Order Information

Storage for Wireless Temp, pH and Conductivity Sensors...PS-3585
Storage Tray for Wireless Pressure Sensors.....PS-3586
Wireless Colorimeter and Turbidity Sensor PS-3587
Storage Tray for Wireless Voltage & Current Sensor.....PS-3588
Storage Tray for Wireless Motion Sensor PS-3589

Order Information

Storage Tray for Wireless Light Sensor and AirLink.....PS-3594
Storage Tray for Wireless Force Sensor PS-3595
Wireless Weather Sensor Storage Tray PS-3596
Wireless CO_2 Sensor Storage Tray.....PS-3598

Gratnells® Storage Trays with Lids

These empty Gratnells storage trays with lids have a length of 427 mm and width of 312 mm. The depth of each follows:

F1: 75 mm
F2: 150 mm
F25: 225 mm
F3: 300 mm

F1 F2 F25 F3

Order Information

Storage Tray (F1) Shallow PS-3326
Storage Tray (F2) Deep PS-3327
Storage Tray (F25) X-Deep PS-3328
Storage Tray (F3) Jumbo.....PS-3329

Storage Bins

SE-7560

These stackable plastic bins with lids can be useful for storing equipment and accessories in your lab.

14" L x 9.5" W x 6.9" D

Order Information

Storage Bins (Set of 5).....SE-7560

Wireless Sensor Charging Station

This versatile charging station can be configured to fit any size sensor by adding or removing partitions.

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Wireless Sensor Charging Station PS-3599

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(Physics Lab Station: Mechanics Extension set shown here)

CT-IHS