

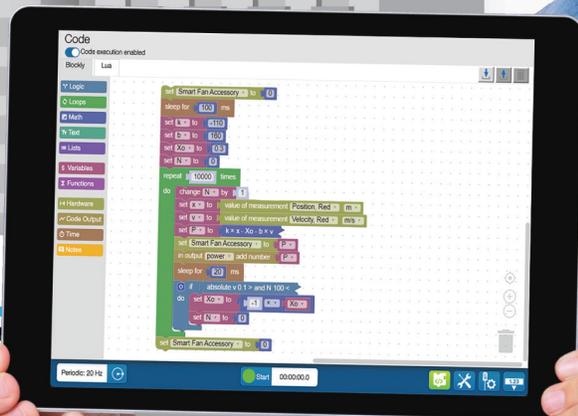
PASCO

MIDDLE SCHOOL & ELEMENTARY 2022

NEW

STEM Sense
STEM Solutions

MindLabs
Energy & Circuits





Sensor Technology

Our innovative, award-winning wireless sensors are low-cost, rugged, and easy to use. PASCO now offers more than 30 wireless sensors.



Data Collection + Coding

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



Complete Lab Stations

These Lab Stations make it easy to use sensor-based technology in the science classroom. Each kit comes classroom-ready with wireless sensors, hands-on labs, and engaging video lessons.



STEM & Coding Solutions

Help learners build strong foundations in science and STEM with cross-curricular STEM Sense Kits. Each complete kit includes all the equipment and accessories students need, as well as scaffolded activities to support their coding journey.



Professional Development & Tech Support

Our PD is relevant for teachers at all grade levels, and includes ongoing teacher support. You can also take advantage of our wealth of training videos at pasco.com.



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

 <p>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.</p>	 <p>Wireless Motion Sensor This sensor measures the position, velocity, and acceleration of objects, and it even includes a 180° rotatable head for creative applications.</p>	 <p>Wireless Hand-Grip Heart Rate Sensor Easily measure heart rate before, during, and after exercise with live data that wirelessly transmits to your devices.</p>
 <p>Wireless Light Sensor This sensor features two separate apertures for measuring light level (lux), illuminance, UV Index, and color intensity.</p>	 <p>Wireless Sound Sensor Get two sensors in one wireless package: a sound wave sensor and a sound level sensor with both dBA and dBC-weighted scales.</p>	 <p>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.</p>

Our growing line now includes over 30 wireless sensors!





SPARKvue

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

 Windows •  Mac OS •  iOS •  chrome •  ANDROID

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

In SPARKvue 4, we've added new features, including Blockly coding. Now, students can use block-based code to sense and control PASCO devices, including any of our sensors.

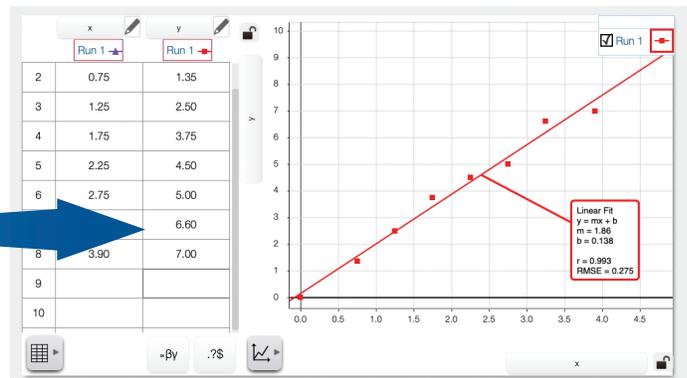
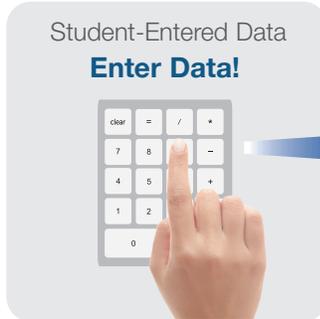


Student Data Collection...**MADE EASY!**

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.

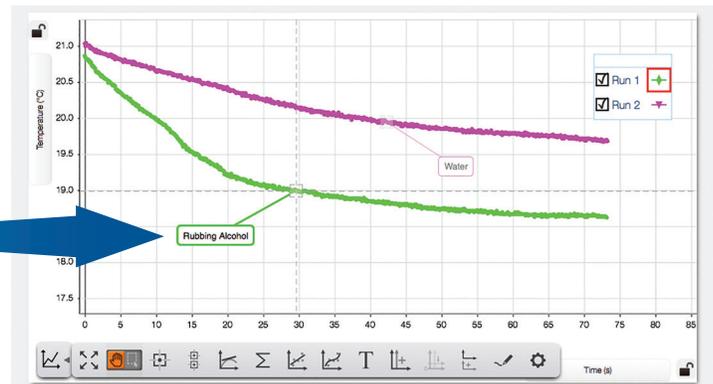


Graph & Analyze Student-Entered Data

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.



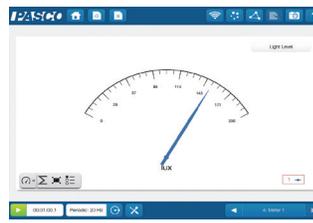
Rapid, Real-Time Data Collection & Analysis



Digits Display



Bar Graph Display



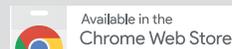
Meter Display



GIS Map Display

Get Started Today! Try SPARKvue software for FREE.

The complete version of SPARKvue is now available as a FREE app for Chromebook™, iPad®, Android™ tablets, and Apple® and Android™ smartphones.



We also offer 30-day free trials for Windows™ and Mac® visit www.pasco.com/downloads

SPARKvue Single User License.....PS-2401	\$102
SPARKvue Single User License.....PS-2401-DIG	\$102

SPARKvue Site License.....PS-2400	\$249
SPARKvue Site License.....PS-2400-DIG	\$249

Elementary School Science Solutions

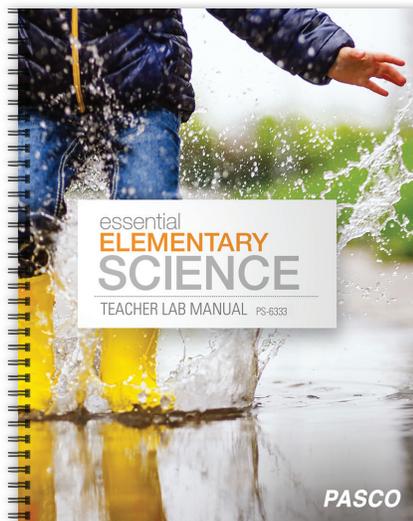


PASCO's solutions for Elementary School science provide the tools students need to develop scientific foundations through hands-on discovery.

Our simple designs empower students to explore the world around them through observations coupled with live data collection and analysis.

Elementary Science Starter Lab Station

The Elementary Science Starter Lab Station makes it easy and affordable to begin using sensor-based technology in your Elementary classroom. 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 collection of elementary labs, with more than 40 labs available now from our online Experiment Library.



Elementary School Science Lab Titles

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

Starter Station Labs

- Temperature and Change
- Evidence of Chemical Reactions
- Thermal Insulators and Conductors
- Can Plants Survive Without Light?
- How a Greenhouse Works: Heat
- How a Greenhouse Works: Light
- MatchGraph

Extension Station Labs

- Determining Sound Levels
- Weather and Climate: Microclimates
- Weather and Climate: Monitoring Weather

The Elementary Science Starter & Extension Lab Stations include a lab manual as well as these wireless sensors and materials:

Elementary Science Starter Lab Station

- ▶ Temperature
- ▶ Light
- ▶ Motion
- ▶ Storage Case



Elementary Science Extension Lab Station

- ▶ Sound
- ▶ Weather



Elementary Science Starter Lab Station.....PS-3314 \$339

Elementary Science Extension Lab StationPS-3315 \$305

Middle School Science Solutions

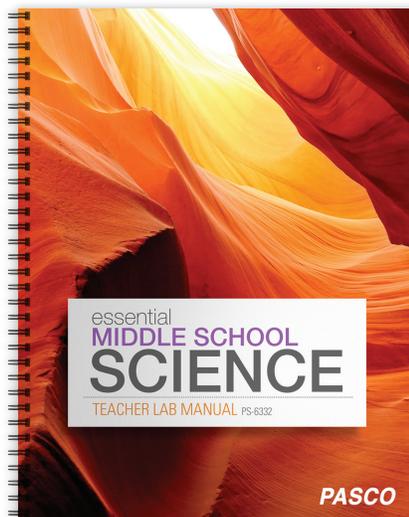


PASCO's Middle School science solutions help fulfill standards while fostering critical thinking skills that prepare students for High School sciences.

Our products facilitate hands-on investigations with intuitive tools for data collection and analysis.

Middle School Science Starter Lab Station

The Middle School Science Starter Lab Station makes it easy and affordable to begin using sensor-based technology in your Middle School classroom. 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 the ten labs included inside the Essential Middle School Science Lab Manual, as well as many of the Middle School labs available from 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.

Starter Station Labs

- Describing Motion
- Night and Day
- Seasons and Temperatures
- Thermoregulation
- Introduction to Acids
- Acid Rain and Weathering

Extension Station Labs

- Photosynthesis
- Humidity and Dew Point
- Forces and Interactions
- Waves and Energy

The Middle/Secondary School Science Starter & Extension Lab Stations include a lab manual as well as these wireless sensors and materials:

Middle School Science Starter Lab Station

- ▶ Temperature
- ▶ Light
- ▶ pH
- ▶ Motion
- ▶ Storage Case



Middle School Science Extension Lab Station

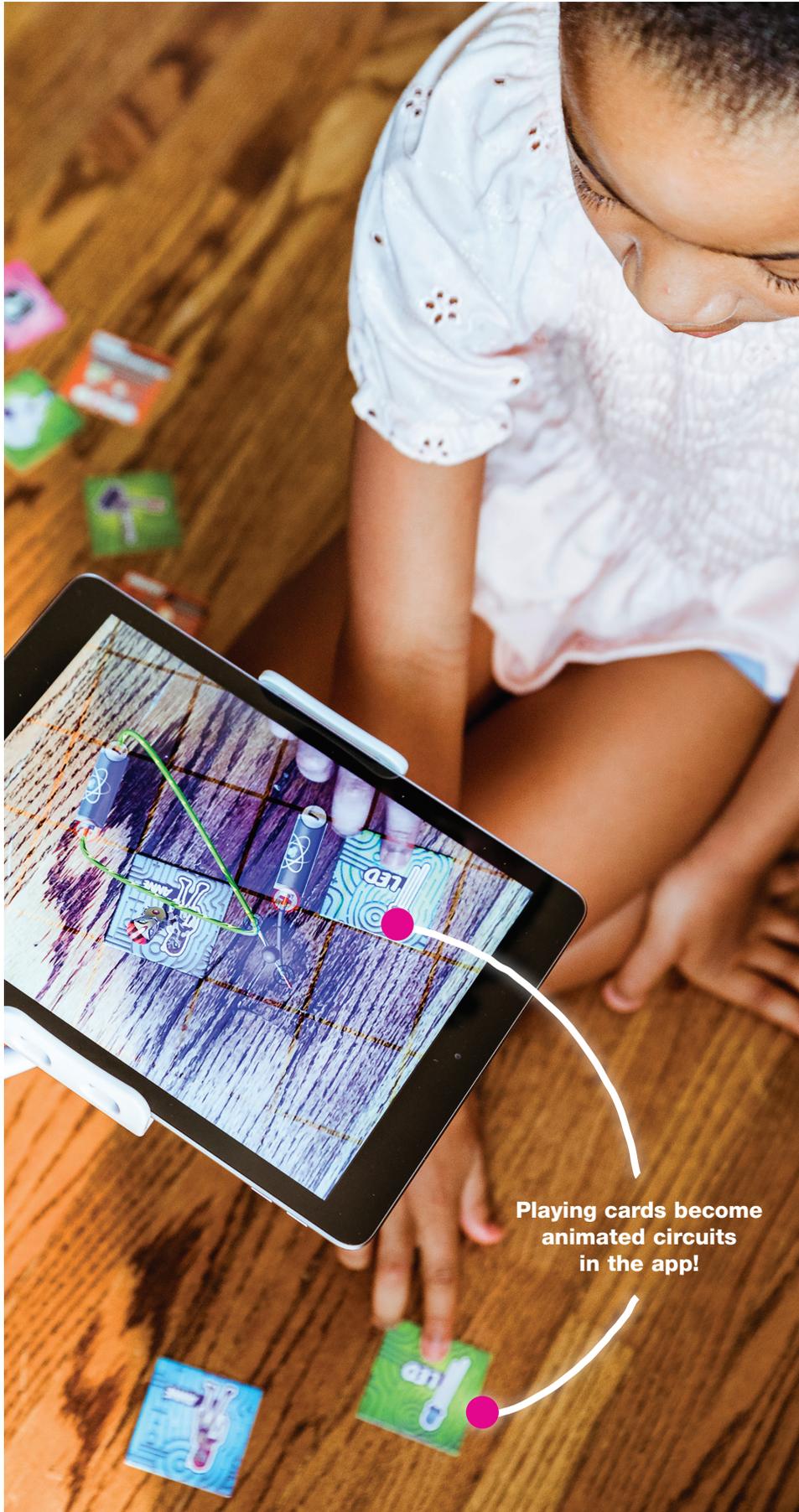
- ▶ CO₂
- ▶ Weather
- ▶ Sound
- ▶ Force/Acceleration



Middle School Science Starter Lab Station.....PS-3312 \$399

Middle School Science Extension Lab StationPS-3313 \$635

Mindlabs - A Game To Learn About Energy & Circuits



Playing cards become animated circuits in the app!

Launch Interactive app



TRY IT!

Open the app and select "Create" from the menu. Point your mobile device at the appropriate character card in your card deck.

Build Animated Circuits



Assemble picture cards into working circuits. Draw and connect wires on a mobile device to bring circuits to life!

Investigate Concepts



Explore and investigate concepts with step-by-step activities and animated vocabulary and idea cards.

MindLabs - A Game To Learn About Energy & Circuits



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
- For 1 to 4 players, ages 8+

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

Gooseneck tablet stands free up student hands for interacting with cards and app.



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! The ideal learning tool for solo or team play, MindLabs enables students to explore energy sources, circuits, and more through exciting stories and gameplay.

- 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
- Explore forms of energy with animated vocabulary cards
- Investigate energy resources with animated idea cards
- Step-by-step lessons guide students through basic circuit concepts

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



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 sold separately and are not included with the single set or class sets. The Complete Class Set comes standard with 6 Gooseneck Tablet Stands.

MindLabs: Energy & Circuits Single Set.....SE-7170	\$14
MindLabs: Energy & Circuits Class Set.....SE-7171	\$65
MindLabs: Energy & Circuits Complete Class Set .SE-7172	\$235
Gooseneck Tablet Stand.....SE-7173	\$29

STEM SENSE SOLUTIONS



STEM Sense solutions help build early excellence 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, phenomena-based investigations; and all the equipment and supplies students need to complete the investigations.

STEM Sense Kits come classroom-ready with all the equipment and materials needed to support students through their coding journey.



Coding With Sensor Technologies Kit



Coding With Vehicle Sensor Technologies Kit

Student Activities + Teacher Resources

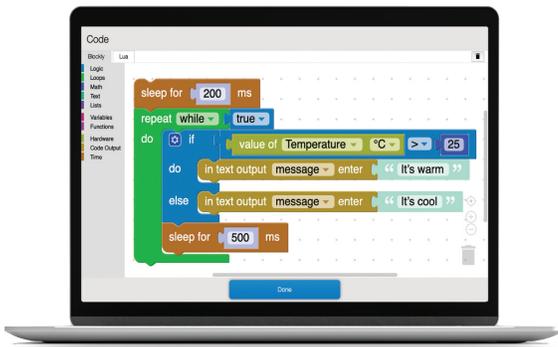
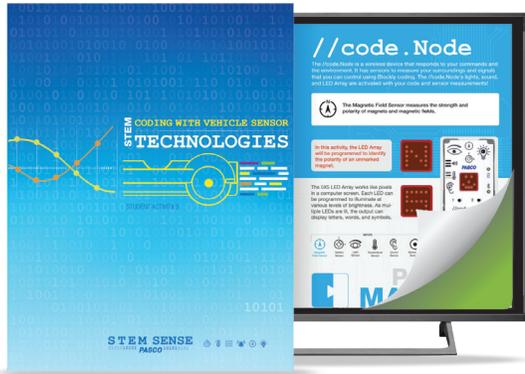
Whether they're new programmers or hobby hackers, STEM Sense Kits make it easy to support students of all learning levels with a variety of scaffolded activities and open-ended challenges. Each lesson is based upon the latest science standards and incorporates cross-curricular connections to reinforce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



Coding With Sound & Light Sensor Technologies Kit



PASCObot Sense & Control Kit



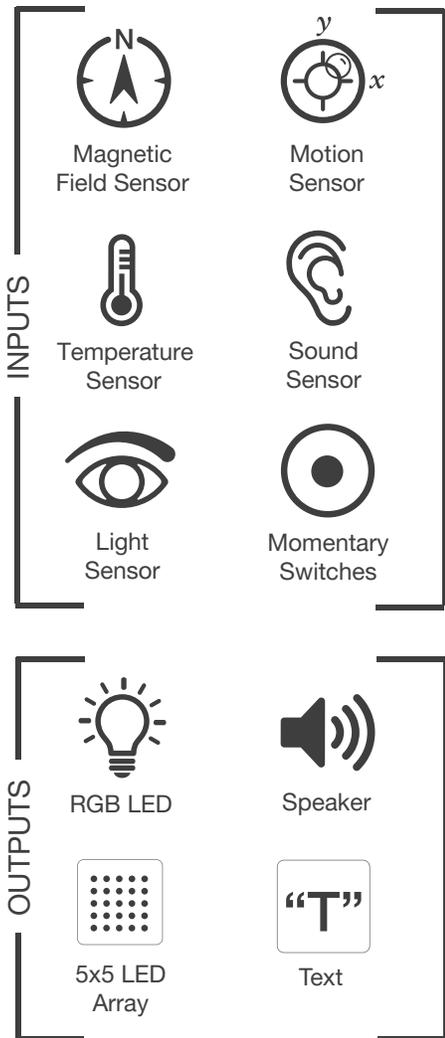
Greenhouse Sense & Control Kit

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 kids to explore the things they love through coding. Together, the //code.Node, interactive Flipbooks, 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.



//code.Node	PS-3231	\$89
//code.Node Holder.....	PS-3233	\$9
//code.Node (Set of 8)	PS-3311	\$750



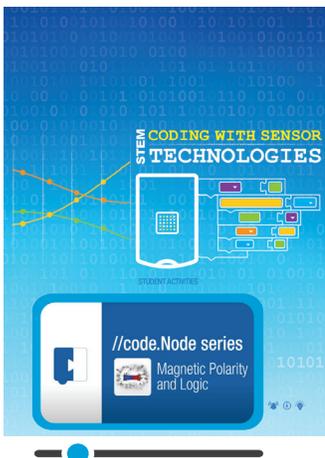
Coding with Sensor Technologies Kit

ST-7800

The Coding with Sensor Technologies Kit introduces students to foundational coding concepts 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 & 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.

```

set Number of steps to 0
repeat while true
do
  if absolute value of Acceleration - x m/s² ≥ 15
  do
    change Number of steps by 2
    in number output Steps enter Number of steps
    repeat while absolute value of Acceleration - x m/s² ≥ 15
  do
    sleep for 20 ms
  
```

Coding with Sensor Technologies Equipment

The Coding with Sensor Technologies Kit includes a //code.Node, two painted bar magnets, a color printed booklet of student activities 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 that enable students to explore exciting phenomena using block-based programs that collect, display and respond to data. The interactive Flipbook can be accessed from any web browser for flexible instruction.



Includes:

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

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

\$129



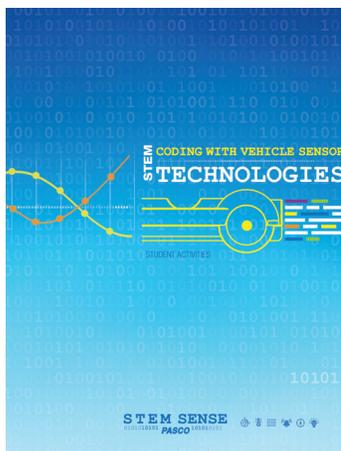
Coding with Vehicle Sensor Technologies Kit

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

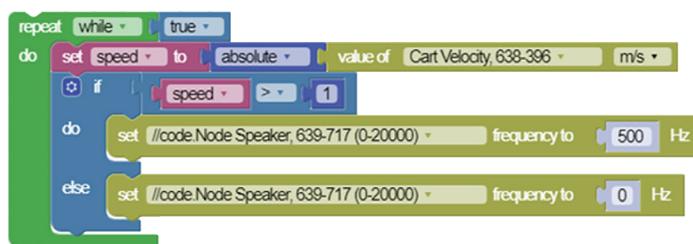
Help students develop competency in:

- ▶ 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, 1.5m
- Spool of Thread
- Block Person Figurines (Qty. 2)

Coding with Vehicle Sensor Technologies KitST-7820

\$190



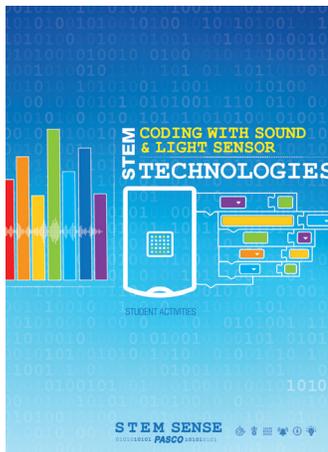
Coding with Sound and Light Sensor Technologies Kit

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



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.

```

repeat while true
do
  if value of Button 1 == 1
  do
    set //code.Node Speaker (0-20000) frequency to 100 Hz
  else if value of Button 2 == 1
  do
    set //code.Node Speaker (0-20000) frequency to 0 Hz
  
```

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"x4" Sheets (Qty. 35)
- Aluminum Foil Sheet, 4"x4" Sheets (Qty. 5)

Coding with Sound and Light Sensor Technologies Kit.....ST-7830 \$145

INTRODUCING

PASCObot





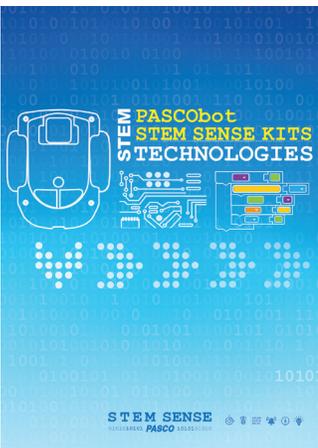
PASCObot

PS-2994

The PASCObot helps harness students' interest in robotics to drive deeper learning in science and STEM. With scaffolded activities and plenty of room for personalization, the PASCObot opens a new world of opportunity for students to grow, create, and even compete! This kit includes all the materials needed to build, program, and control the PASCObot.

Student Activities

The PASCObot is supported by student activities that cover everything from coding the robot's first movements to navigating it through a custom obstacle course. Once they've mastered the basics, students can continue their journey by creating their own Blockly programs, PASCObot challenges, and head-to-head competitions.

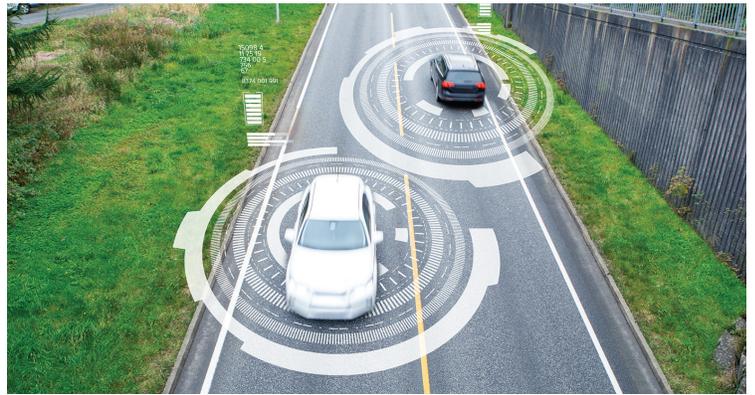


Student Activities

- ▶ Navigating a Simple Maze
- ▶ Object Avoidance
- ▶ Line Following
- ▶ Line Following with Objects
- ▶ Adjusting Speed on an Incline
- ▶ Locating, Gripping, and Moving Objects

Help students develop competency in:

- ▶ Coding
- ▶ Mathematics
- ▶ Computational thinking
- ▶ Collaborative problem solving
- ▶ Engineering and Design practices



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

- ▶ Automotive engineering
- ▶ Innovations in self-driving vehicles
- ▶ Risk mitigation through engineering and design

Block-Based Coding

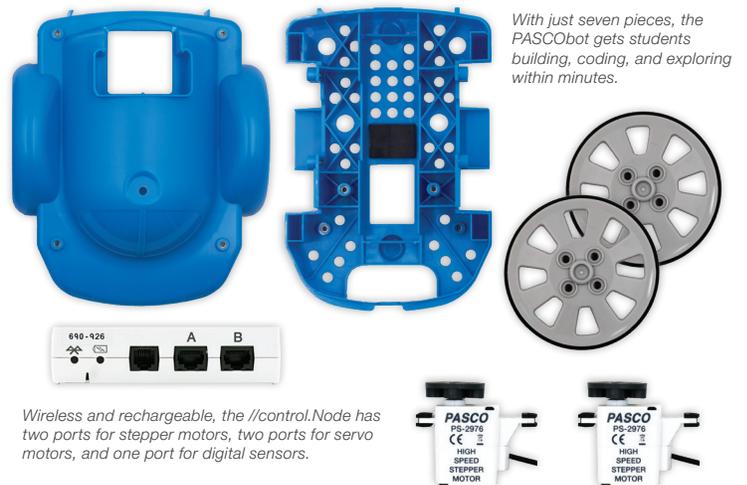
Blockly simplifies the programming process for new coders. Visual coding blocks connect like puzzle pieces to help students master the basics of programming, without having to worry about their syntax.

PASCObot Equipment

The PASCObot comes with all the materials needed to build, program, and control the PASCObot. Simple to build and easy to program, the PASCObot consists of just seven pieces, including a PASCObot Body, two Wheels, two Stepper Motors, and a rechargeable //control.Node that enables students to execute their code in real time or store it onboard for execution later.

Includes:

- PASCObot Body
- //control.Node
- 2 Stepper Motors
- 2 Wheels
- Student activities (digital)



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

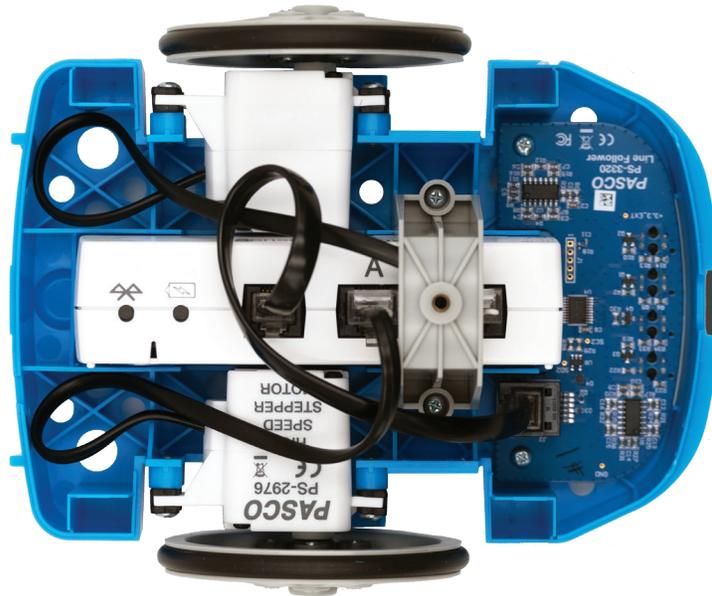
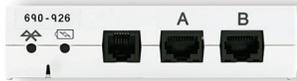
PASCObotPS-2994

\$259

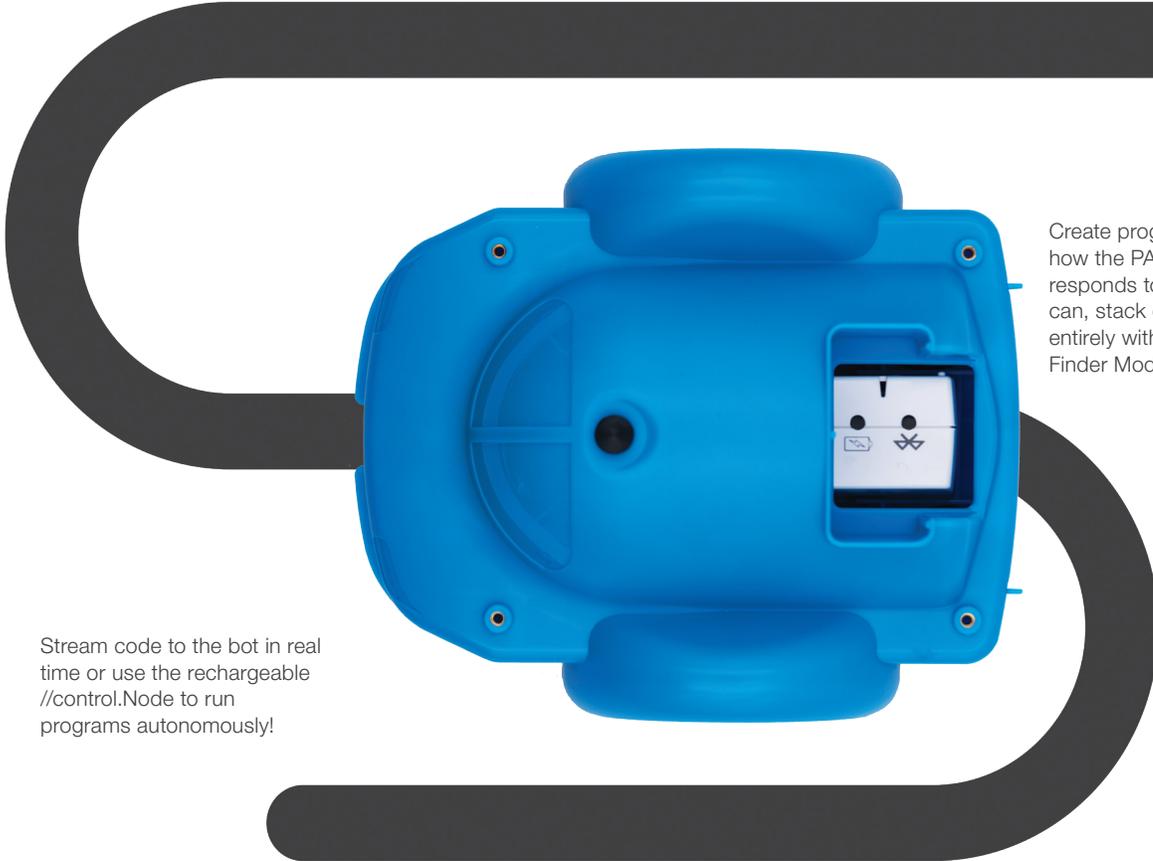
PASCObot

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.



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



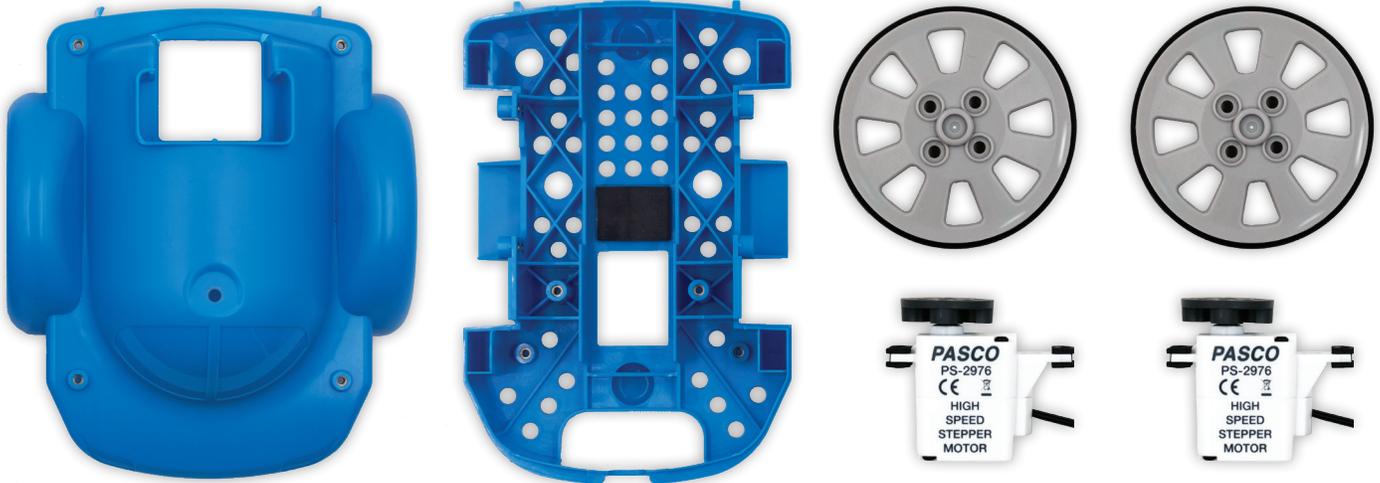
Create programs that control how the PASCObot identifies and responds to objects! Pick up a can, stack cups, or avoid objects entirely with the included Range Finder Module.

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

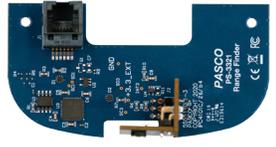
STEM Sense - STEM Solutions

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.

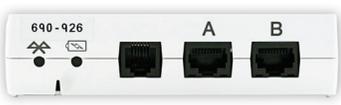
This complete kit includes a PASCObot and //control.Node, as well as all the accessories needed to program how the bot interacts with its environment. From simple movements and spins to navigating objects and complex obstacle courses, there's no limit to what students can create with PASCObot!



The Line Follower Module enables the PASCObot to 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.

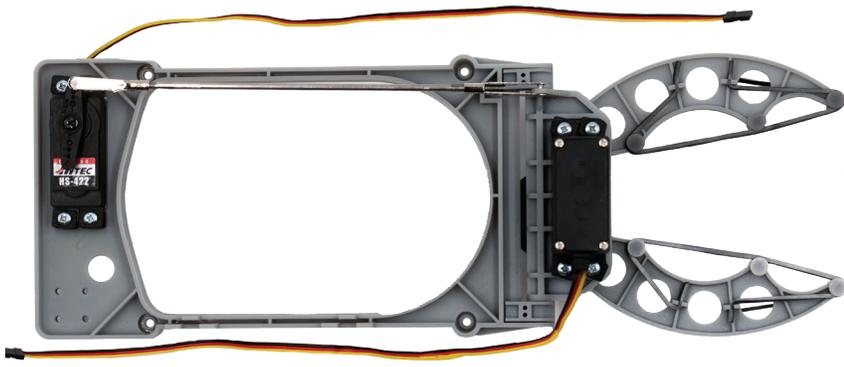


Wireless and rechargeable, the //control.Node has two ports for stepper motors, two ports for servo motors, and one port for digital sensors.



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.



PASCObot Sense & Control Kit	ST-7840	\$479
<i>The PASCObot Sense & Control Kit 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.</i>		
PASCObot Line Follower Module	PS-3320	\$44
PASCObot Range Finder Module.....	PS-3321	\$69

PASCObot Gripper Accessory	PS-3325	\$30
PASCObot Servo Motor	SE-2975	\$17
Black and White Tape (rolls)	SE-2953	\$32
Small Plastic Cup Set (5 colors)	SE-2952	\$12



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.

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 let's 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.



Student Activities

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

Greenhouse Sense & Control Kit Equipment

This complete kit includes: an EcoChamber and //control.Node; a Power Output Module; a fan; a water pump; tubing with drip-watering ends; a PASCO Grow Light; a Sensor Module; and a Greenhouse Sensor that measures light, temperature, humidity, and soil moisture.



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

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

\$549

Create your own ecosystem, optimize growth, and more!

Hassle-free ports make it easy to mix and match sensors, while also permitting gas exchange.

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

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

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

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.

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

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

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



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

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

Wireless Sensors

Wireless pH Sensor

Equally capable in the lab or field, the Wireless pH Sensor eliminates the hassle of cables, reducing spills and improving safety. 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 introductory pH lessons, investigations into household acids and bases, water quality studies, and much more.

Features:

- ▶ Bluetooth® connectivity and a long-lasting coin cell battery
- ▶ Logs pH data directly onto the sensor for long-term experiments



Wireless pH Sensor PS-3204 \$89

Wireless Pressure Sensor

The Wireless Pressure Sensor allows students to easily collect accurate gas pressure data for a wide range of applications. It can also be used as a potometer.

Perform These Experiments:

- ▶ Investigate pinch-grip strength and muscle fatigue
- ▶ Measure transpiration rates in plants



Wireless Pressure Sensor PS-3203 \$98

Wireless Exercise Heart Rate Sensor

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). As students move, their cardiac data is wirelessly transmitted to their device.

Applications:

- ▶ Compare a student's heart rate before, during, and after exercise
- ▶ Calculate recovery rate after physical activity
- ▶ Determine the effects of mild stimulants (e.g. caffeine)



Wireless Exercise Heart Rate Sensor PS-3207 \$89

Wireless Temperature Sensor

Welcome to the modern thermometer. Students can access instant temperature readings, but also continuously monitor, log, and plot temperature data.

Perform These Experiments:

- ▶ Explore freezing and melting points
- ▶ Study endothermic and exothermic reactions
- ▶ Measure the energy content of food
- ▶ Monitor environmental conditions and water quality
- ▶ Compare energy efficiency between light bulbs



Wireless Temperature Sensor PS-3201 \$59

Wireless Hand-Grip Heart Rate Sensor

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.

Features:

- ▶ Wireless design enables free movement
- ▶ Long-lasting, coin cell battery
- ▶ Displays live graphs for student analysis



Wireless Hand-Grip Heart Rate Sensor PS-3206 \$107

Wireless Weather Sensor with GPS

The Wireless Weather Sensor 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 record ambient conditions that are relevant to environmental phenomena.

Features:

- ▶ Logging mode for long-term experiments
- ▶ Water resistant for extended environmental monitoring
- ▶ 19 different measurements that can be collected and analyzed individually or simultaneously



Wireless Weather Sensor with GPS PS-3209 \$210

Wireless CO₂ Sensor

Measure changes in carbon dioxide (CO₂) gas levels quickly and easily with the Wireless CO₂ Sensor. The sensor is temperature-compensated and can operate in high humidity environments, such as the included 250-mL sample bottle.



Demonstrate:

- ▶ Measure respiration in compost or other decomposer-rich environments
- ▶ Explore carbohydrate consumption rates due to human activity
- ▶ Monitor CO₂ levels during photosynthesis and respiration experiments
- ▶ Study carbon cycling in a model ecosystem
- ▶ Monitor CO₂ levels for indoor air quality

Wireless CO₂ Sensor PS-3208 \$210

Wireless Light Sensor

The Wireless Light Sensor features two separate apertures - one for ambient light measurements and one for directional light measurements. The ambient sensor measures illuminance and UV Index, while the spot (directional) aperture measures light level and color intensity. Our software displays the relative intensities of Red, Green, and Blue light, then sums them to determine the level of White light.



Applications:

- ▶ Studying solar energy
- ▶ Monitoring UV light levels
- ▶ Reflection, absorption, and transmission of light through clear, opaque, and variously colored translucent mediums.

Wireless Light Sensor PS-3213 \$89

Wireless Motion Sensor

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 their own distance to the sensor, while the class observes their motion materializing as a graph in real time.



Applications:

- ▶ Pair with free MatchGraph software to teach motion-graphing
- ▶ Explore speed and velocity
- ▶ Clips directly to PASCO Dynamics Tracks

Wireless Motion Sensor PS-3219 \$109

Wireless Sound Sensor

The Wireless Sound Sensor contains Sound Level and Sound Wave functions that measure true sound level (intensity) and relative changes in sound pressure level as sound waves incident on the sensor.



Applications:

- ▶ Measure sound level and frequency
- ▶ Measure the speed of sound in air
- ▶ Study sound waves
- ▶ Investigate resonance and standing waves

Wireless Sound Sensor PS-3227 \$99

Wireless Force Acceleration Sensor

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. Students can use the finger-holes for handheld applications, or mount it onto a cart or rod.



Features:

- ▶ ±50 N
- ▶ 3-axis accelerometer
- ▶ 3-axis gyroscope
- ▶ Built-in rod clamp
- ▶ Onboard datalogging

Wireless Force Acceleration Sensor PS-3202 \$109

Smart Cart Patent Number 10,481,173

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. 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:

- ▶ Records and displays live motion data
- ▶ Rechargeable battery
- ▶ Collects data on or off a track

Smart Cart (Red) ME-1240 \$185
 Smart Cart (Blue) ME-1241 \$185



Wireless Motion Sensor & MatchGraph Software

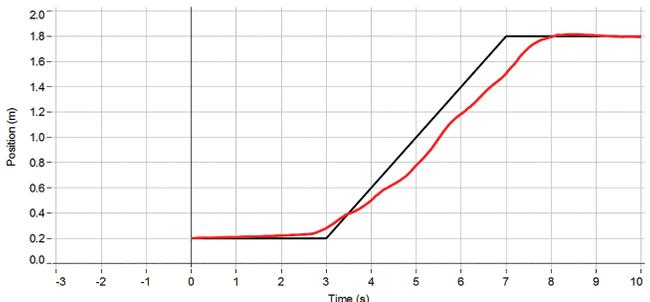
MatchGraph engages students in kinesthetic experiences to make motion graphing lessons intuitive and memorable. In MatchGraph, students attempt to match their motion to one of the nine graphs and receive a score based on how accurately they replicate the graph's curve. These activities help familiarize students with the creation and interpretation of motion graphs, as they see their own position and velocity being graphed in real time.

Students can use MatchGraph and a PASCO Motion Sensor to create and analyze graphs of their own motion, or add a Smart Cart for more motion-graphing fun. When used with a Smart Cart, MatchGraph produces a real-time plot of the cart's motion, enabling students to explore new scenarios.

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.

The Wireless Motion Sensor connects via Bluetooth or USB to your device, and uses ultrasound to measure the position, velocity, and acceleration of objects.



FREE MatchGraph! Software

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

Wireless Motion SensorPS-3219 \$109

