

# STEM SENSE

Promoting excellence in STEM education by building strong foundations in science, programming and data literacy.

## PASCObot

Sense & Control with the all new PASCObot! (Pgs. 10-13)



NEW



Bring STEM to life with hands-on coding kits & activities.



Code without limits with Blockly coding and SPARKvue!

Design, code, and create with new sense & control kits.



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# 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.

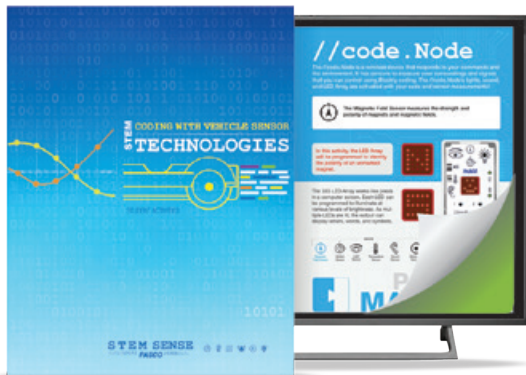
STEM Sense Kits come classroom-ready with all the equipment and materials needed to support students through their coding journey.



Coding With Sensor  
Technologies Kit



Coding With Vehicle Sensor  
Technologies Kit



## Student Activities 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, 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 & 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.



Coding With Sound & Light  
Sensor Technologies Kit



PASCObot Sense &  
Control Kit



Greenhouse Sense &  
Control Kit

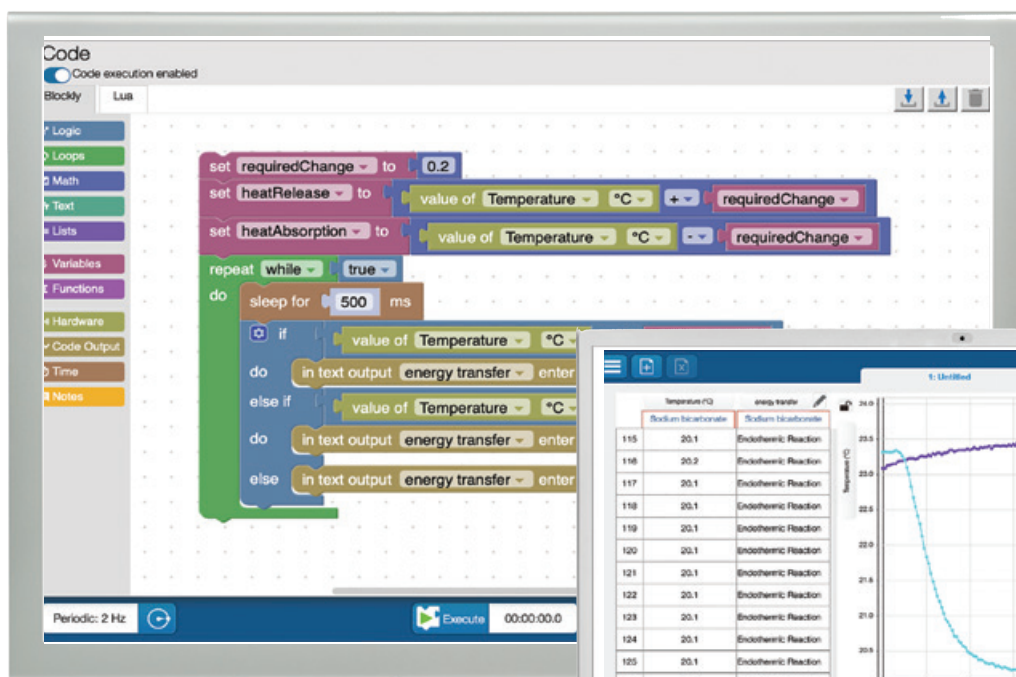
## SPARKvue & Blockly Coding: Computational Thinking Meets Data Literacy

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 more—all without coding experience.

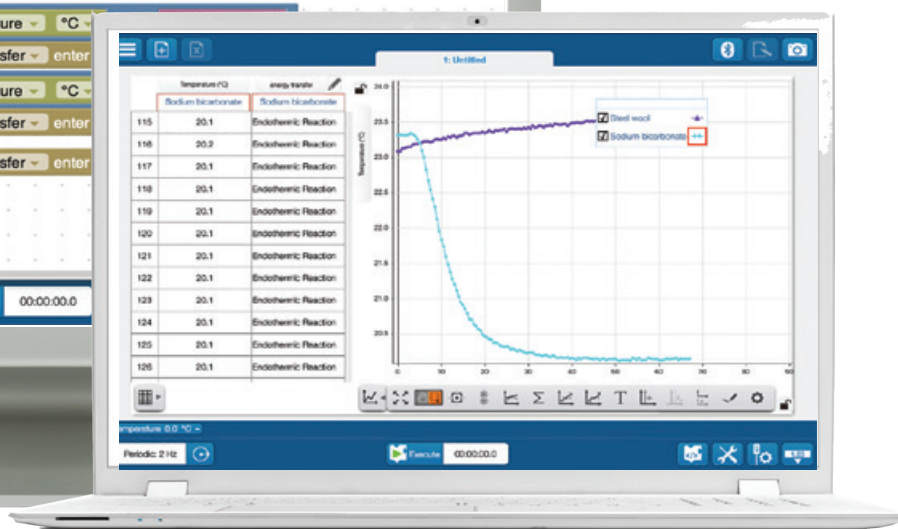
Use Blockly in SPARKvue to:

- 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
- Control the PASCObot



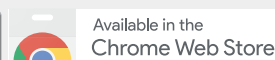
Create code that collects, displays, and responds to sensor data! Interact with the physical world using the PASCO `//code.Node` or `//control.Node`.

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



Try SPARKvue with Blockly for FREE.  
Get Started Today!

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](http://www.pasco.com/downloads)

# This award-winning data collection and analysis software now includes Blockly coding with data displays!

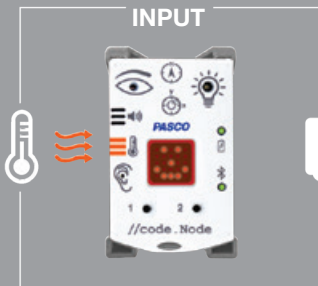
Getting started with //code.Node is quick and easy. Simply connect the //code.Node to SPARKvue and begin coding instructions for its sensor inputs and device outputs. As the code is executed, SPARKvue displays real-time data from the //code.Node's active sensors, which triggers a response from the //code.Node's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



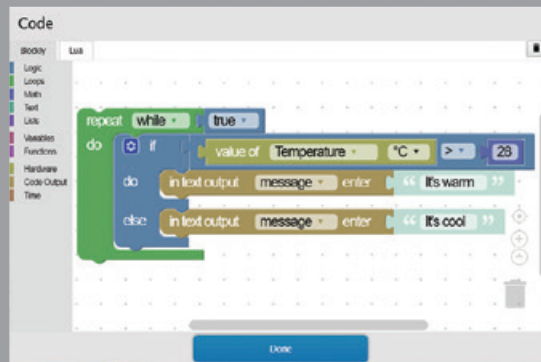
Explore more advanced coding applications with the //control.Node and Sense & Control Kits

## CODING IN SPARKVUE

## OUTPUT



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



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



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

## OUTPUT



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

### Order Information

- SPARKvue Single User License.....PS-2401
- SPARKvue Single User License.....PS-2401-DIG

### Order Information

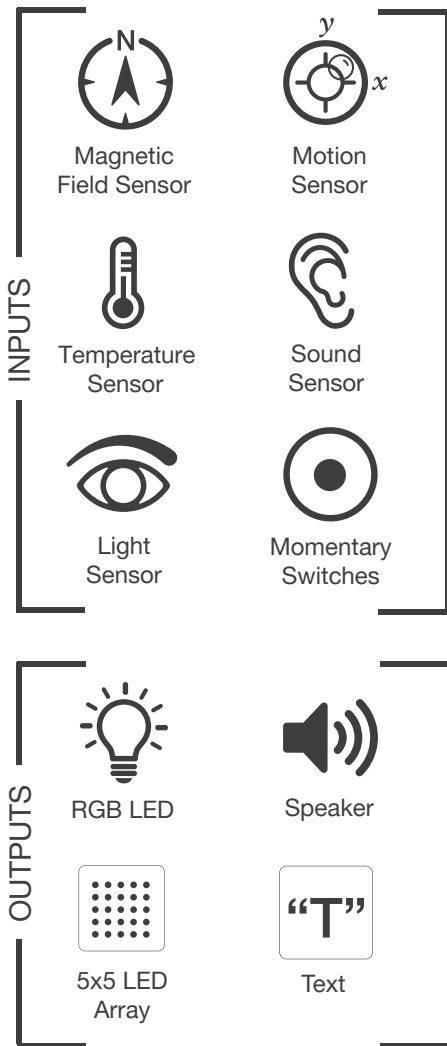
- SPARKvue Site License .....PS-2400
- SPARKvue Site License .....PS-2400-DIG

# 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.



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



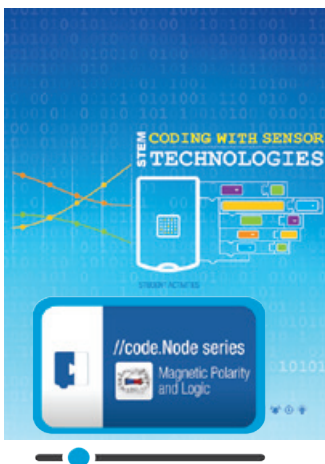
## Coding with Sensor Technologies Kit

ST-7800

The Coding with Sensor Technologies Kit introduces students to 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

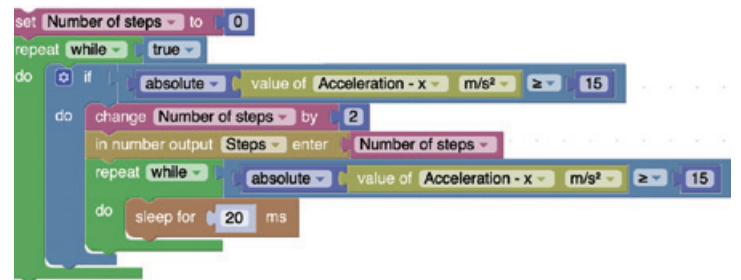
### Help students develop competency in:

- ▶ 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.



### 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

### Order Information

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



## 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.

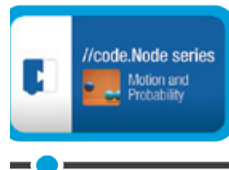
### Student Activities and Video Lessons

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

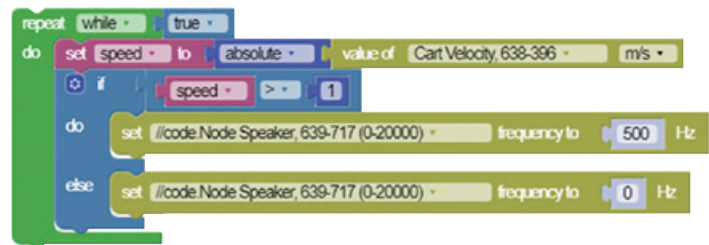
**Help students develop competency in:**

- ▶ 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)

### Order Information

Coding with Vehicle Sensor Technologies Kit .....ST-7820





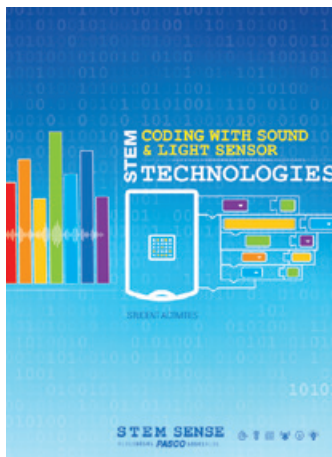
## Coding with Sound and Light Sensor Technologies Kit

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.

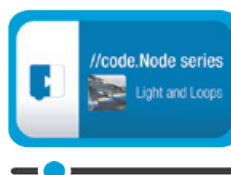
### Student Activities and Video Lessons

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

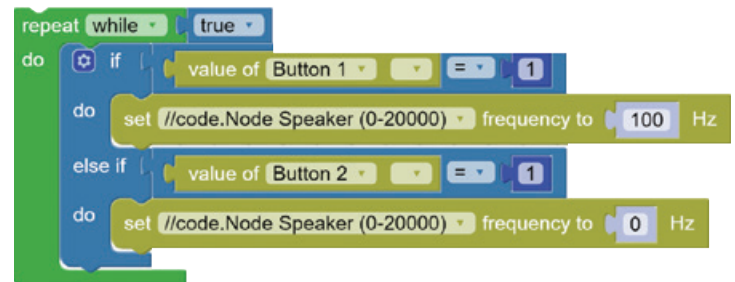
### Help students develop competency in:

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

### Order Information

Coding with Sound and Light Sensor Technologies Kit ST-7830

INTRODUCING  
**PASCO**bot





**NEW**

**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**

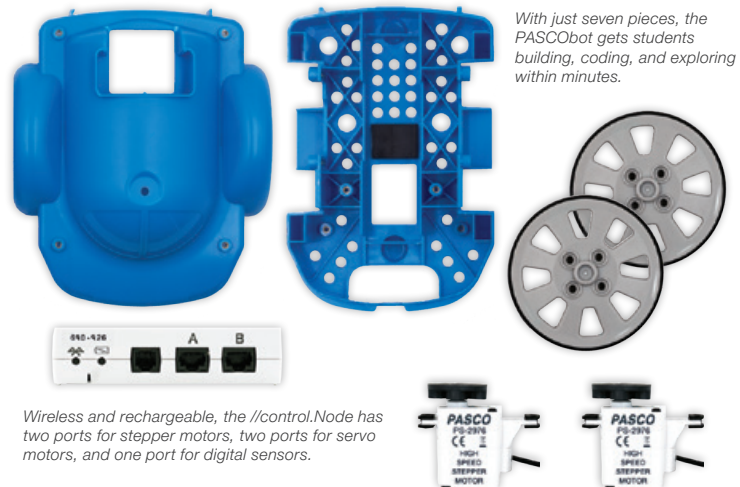
Blockly simplifies the programming process for new coders. Visual coding blocks connect like puzzle pieces to help students master the basics of programming, without having to worry about their syntax.

**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)



*With just seven pieces, the PASCObot gets students building, coding, and exploring within minutes.*

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

**Order Information**

PASCObot .....PS-2994

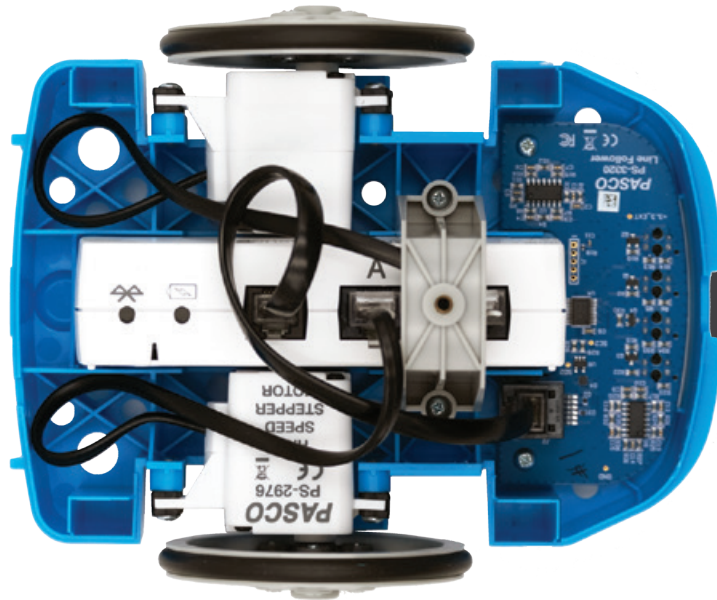
# PASCObot

## SENSE & CONTROL KIT

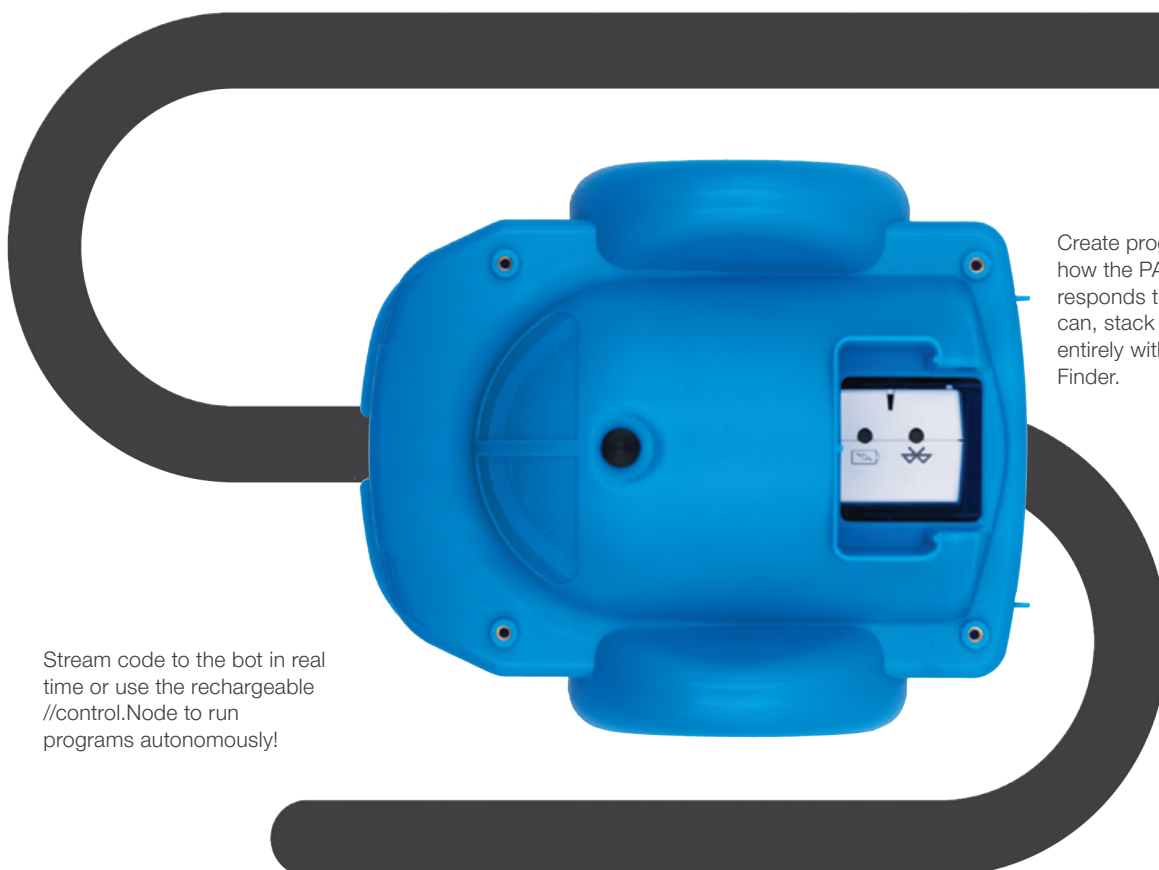
When nestled inside the PASCObot, the //control.Node serves as a brain, providing both power to the bot and memory storage for students' code.



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.

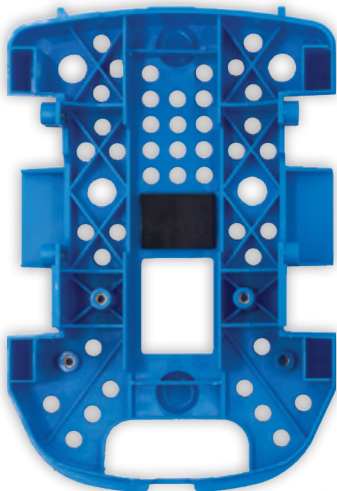


Create programs that control how the PASCObot identifies and responds to objects! Pick up a can, stack cups, or avoid objects entirely with the included Range Finder.

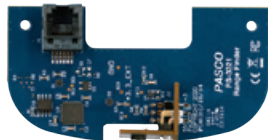
Stream code to the bot in real time or use the rechargeable //control.Node to run programs autonomously!

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



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

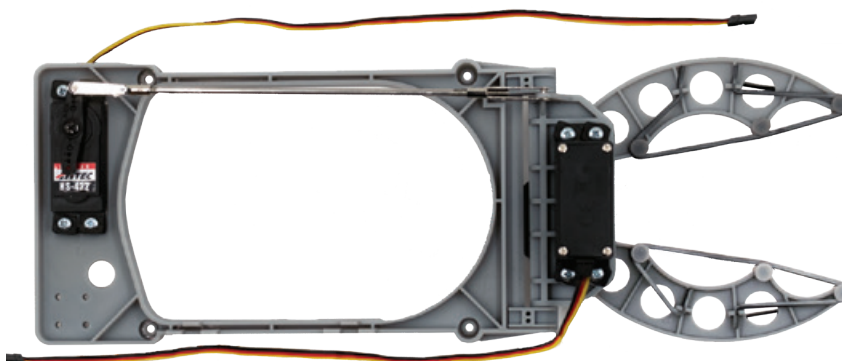


Wireless and rechargeable, the //control.Node has two ports for stepper motors, two ports for servo motors, and one port for digital sensors.



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 Sense & Control Kit.....ST-7840

*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 à la carte ordering.*

PASCObot Line Follower Module .....PS-3320

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

## Order Information

PASCObot Gripper Accessory .....PS-3325

Servo Motor .....SE-2975

Black and White Tape (rolls) .....SE-2953

Small Plastic Cup Set (4 colors).....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 for a Greenhouse
- ▶ Program Perfectly Timed Rain
- ▶ Optimize Water Movement in a Greenhouse
- ▶ Program a Greenhouse Sense & 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 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.

### Greenhouse Sense & Control Kit Equipment

This complete kit includes: an EcoChamber and //control.Node; a breakout board; a fan; a water pump; tubing with drip-watering ends; a red and blue grow light; a sensor module; and a Greenhouse Sensor that measures light, temperature, humidity, and soil moisture.



### Order Information

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

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 Breakout Board 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.

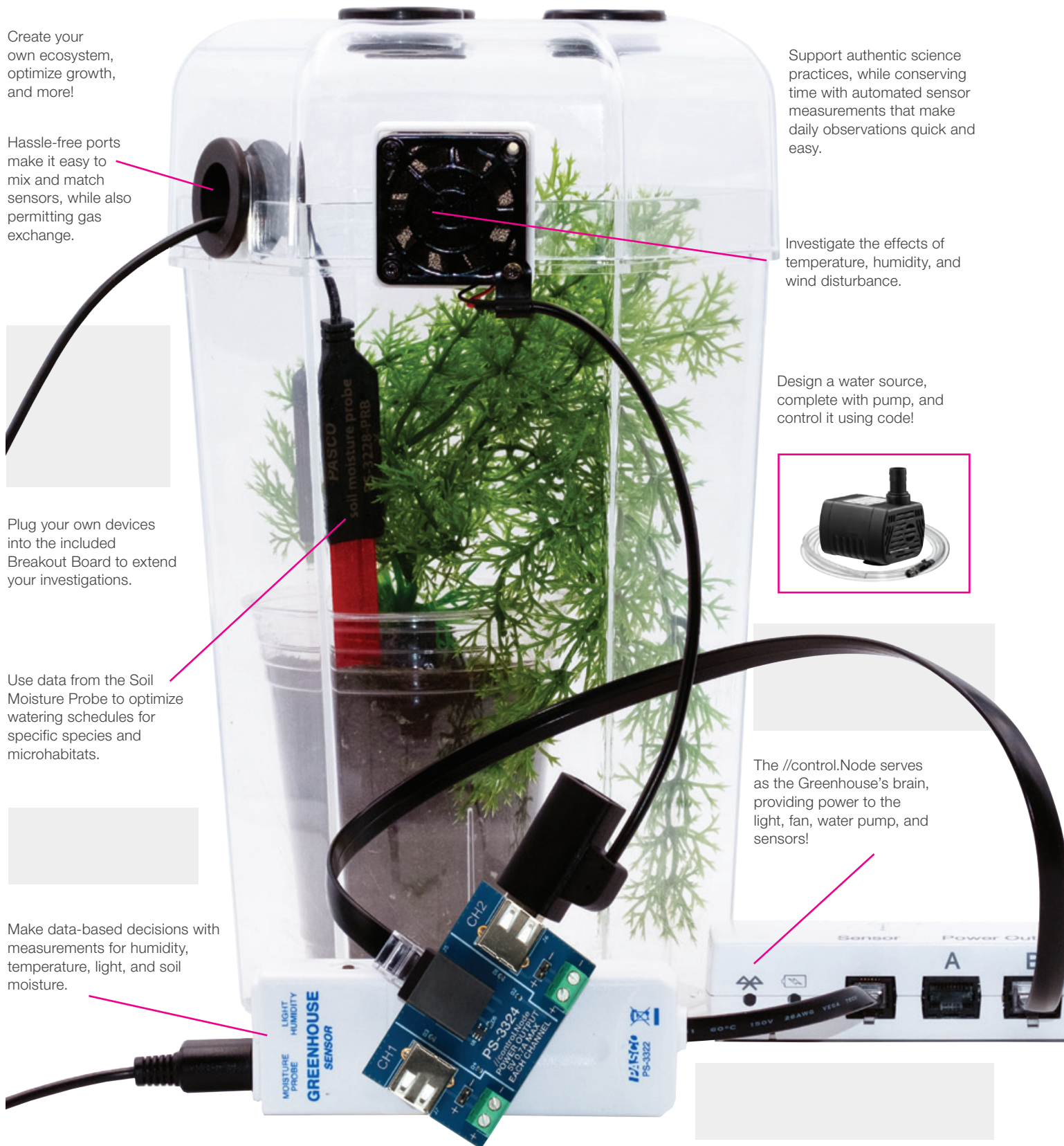
Investigate the effects of temperature, humidity, and wind disturbance.

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.



NEW

## GREENHOUSE KIT

Transform your classroom into a field site with the new Greenhouse Sense and Control Kit! **(Pages 14-15)**



### SENSE & CONTROL

Power student creativity with the new //control.Node and sensors!

