SLS Select education

Go Direct™ 2019

State of the art sensors, transforming the way in which we learn.

Official Distributors of

Vernier®

VERNIER SOFTWARE & TECHNOLOGY

Compatible with Windows, Mac, iOS, Android and Chromebook

- No interface required data logging
- Can be used wired or wireless
- Quick and easy to use
- Free software

Tel: 0115 982 2022 - www.science2education.co.uk - sales@science2education.co.uk

NO INTERFACE REQUIRED

Go Direct sensors from Vernier are low cost sensors which connect directly with computers, Chromebooks, iOS and Android devices via Bluetooth® or USB.

Go Direct Sensors are perfect for educators who need an affordable solution that includes free software and all in one sensors.

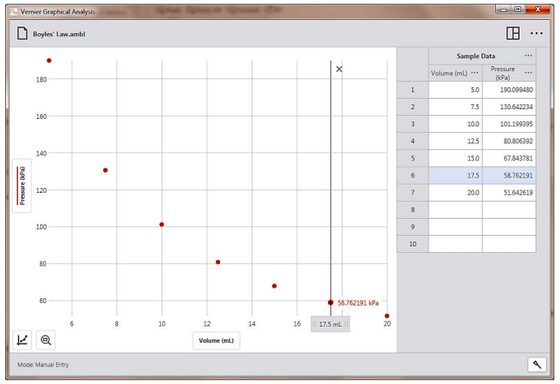
Teacher Friendly, Student Centred

- Free Graphical Analysis 4 app
- Over 30 Go Direct sensors available, with more to be released throughout the year
- Backed by excellent service from SLS Select Education

	Go Direct™
Connection	Connects via USB or Bluetooth 4.2 to your device
Compatible platforms	Chromebook™
	Computer (Windows or Mac)
	iOS Device
	Android™ device
	LabQuest 2
Software	FREE Graphical Analysis™ 4, LabQuest 2 App

New Graphical Analysis™ 4 Software

AVAILABLE AS A FREE DOWNLOAD



Data Collection

- Collect from multiple sensors simultaneously
- Select time based or events based data collection
- Adjust data collection and duration as needed

Data Analysis

- Display 1, 2 or 3 graphs as needed
- View graph and table simultaneously
- Draw predictions
- Define calculated columns based on sensor columns
- Interpolate and extrapolate using graphed data
- Calculate descriptive statistics
- Ability to export data and graphs

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Go Direct™ Temperature Probe

Temperature measurement just got easier!
Connects wirelessly via Bluetooth® or via USB to your platform.

5 year Warranty*

Use this sensor in a variety of experiments:

- Conduct endothermic and exothermic reactions
- Investigate the freezing and melting of water
- Measure the energy content of foods
- Examine the absorption of radiant energy
- Examine the environmental conditions

Code: **SE157480** **£94.00**

The Go Direct Temperature Probe is a rugged, general-purpose sensor that students can use to monitor temperature. Unlike a traditional thermometer, Go Direct Temperature allows students to collect real-time temperature measurements of a single instance or over a period of time. Its range and wireless capability make Go Direct Temperature the go-to sensor for real-world applications.

Technical Specifications

- Temperature range: –40 to 125°C
- Handle temperature range: –10 to 45°C
- Resolution: 0.07°C

Teachers Pack of 8 Go Direct™ Temperature Probes

Code: **SE157488** **£815.00**

Save money when you purchase the Go Direct™ Temp Teacher Pack, which includes eight probes and a charging station.

For more information, go to: science2education.co.uk/product/SE157488

Go Direct™ Surface Temperature Sensor

Low thermal mass, quick response!

5 year Warranty*

Use this sensor in a variety of experiments:

- Investigate the effect of temperature on solar panel output
- Explore passive solar heating or solar collectors
- Examine the warming function of nasal passageways

Technical Specification

- Range: –25 to 125°C
- Accuracy: ±0.5°C
- Response time: 5 seconds

Code: **SE157776** **£94.00**

Designed for use in situations in which low thermal mass or flexibility is required. This sensor has an exposed thermistor that results in an extremely rapid response time, and this design allows for use in air, water and skin.

For more information, go to: science2education.co.uk/product/SE157776

*Warranty excludes battery

Fax: 0115 945 5379 – sales@science2education.co.uk

Go Direct™ pH Sensor

Imagine your smart phone as a pH meter!
Works with tablets and computers too!

5 year Warranty*

Use this sensor in a variety of experiments:

- Conduct acid-base titrations
- Monitor pH change during chemical reactions
- Test the pH and alkalinity of bodies of water
- Investigate household acids and bases

Code: **SE157448** £121.00

The Go Direct pH Sensor (0-14) is an important and versatile sensor for lab and field activities alike. It gives students the freedom to explore pH without the inconvenience of wires—no more spilled solutions or dangling wires. The Go Direct pH transmits live readings and captures data in real-time. The versatile BNC connector allows students to easily replace the electrode when it expires or becomes damaged. You need only replace the electrode and not the entire sensor—lowering your overall equipment costs.

Teachers Pack of 8 Go Direct™ pH Sensors Code: **SE157456** £1,031.00

Save money when you purchase the Go Direct™ pH Teacher Pack, which includes eight probes and a charging station.

For more information, go to: science2education.co.uk/product/SE157448

Go Direct™ Glass Body pH Sensor

5 year Warranty*

Technical Specification

- pH range: 0–14
- Type: glass shaft, sealed combination electrode with Ag/AgCl reference
- Temperature range: 0–80°C (readings not compensated)
- Accuracy: ±0.2 pH units (factory calibration), ±0.05 pH units (user calibration)

Code: **SE157968** £189.00

Use the Go Direct Glass-Body pH to measure pH in aqueous, heterogeneous, and organic solutions. Ideal for higher chemistry.

For more information, go to: science2education.co.uk/product/SE157968

Go Direct™ Glass Body Flat pH Sensor

5 year Warranty*

Technical Specification

- Range: pH 0–14 (some sodium error in ranges greater than pH 12 due to thicker glass and higher impedance values)
- Electrode type: double-junction, sealed, gel-filled, Ag/AgCl reference, polycarbonate body
- Membrane style: flat glass
- Temperature range: 0– 100°C (readings not compensated)

Code: **SE157960** £162.00

The Go Direct Tris-Compatible Flat pH Sensor is a highly versatile sensor, making it useful for measuring the pH of semisolids such as food or soil slurries. Because the glass membrane is flat instead of a bulb, it is more durable, easier to clean, and allows for flat surface measurements or smaller sample sizes. It features a sealed, gel-filled, double-junction electrode, making it compatible with Tris buffers and solutions containing proteins or sulfides.

For more information, go to: science2education.co.uk/product/SE157960

*Warranty excludes battery

Go Direct Electrode Amplifier

A pH and mV amplifier that connects to Vernier and compatible third party electrodes.

5 year Warranty*

Code: **SE157392** £87.00

An affordable way to expand your experiment options. Its BNC connector offers the flexibility to attach and remove a Vernier electrode or any compatible third-party electrode.
Measure pH one day, potassium concentrations the next.

Technical Specifications

- Units: pH or mV
- Input range (mV): ±1000 mV
- Input range (pH): 0 to 14 pH
- Accuracy with new electrode (mV): ±20mV
- Accuracy with new electrode (pH): ±0.2

*Warranty excludes battery

For more information, go to:
science2education.co.uk/product/SE157392
science2education.co.uk/product/SE157560
science2education.co.uk/product/SE157688
science2education.co.uk/product/SE157796

Compatible pH Electrodes

pH Electrode

Technical Specifications

- Temp range: 5 to 80°C (readings not compensated)
- Range 0-14pH

Code: **SE157560** £52.00

Flat pH Electrode

Technical Specifications

- Temp range: 0-100°C (readings not compensated)
- Range 0-14pH

Code: **SE157688** £88.00

Glass Body Electrode

Technical Specifications

- Temp range: 5 to 80°C (readings not compensated)
- Range 0-14pH

Code: **SE 157696** £109.00

Go Direct™ Ion-Selective Electrodes

5 year Warranty*

Technical Specifications

- Range (mV): ±1000mV
- Accuracy: ±10% of full scale (calibrated 1 to 100mg/L)
- Minimum sample size: must be submerged 2.8cm (1.1 in)

- The Nitrate, Calcium, Potassium and Ammonium ISEs are combination-style, non-refillable, and gel-filled electrodes. The Chloride ISE is a solid state device; it does not have a replacement module
- The versatile BNC connector allows students to easily replace the electrode when it expires or becomes damaged. You need only replace the electrode and not the entire sensor—lowering your overall equipment costs
- Vernier ISE membranes, like all other PVC ISE membranes, have a limited life expectancy. However, the replaceable module of Vernier ISEs allow you to simply discard the used membrane module, and replace it with a new one
- Included with each ISE are two calibration standards and a short term soaking bottle

*Warranty excludes battery

SE158064	Ammonium ISE	Range: 1 to 18,000 mg/L or ppm	£338.00	science2education.co.uk/product/SE158064
SE158056	Calcium ISE	Range: 1 to 40,000 mg/L or ppm	£338.00	science2education.co.uk/product/SE158056
SE158048	Chloride ISE	Range: 2 to 35,000 mg/L or ppm	£338.00	science2education.co.uk/product/SE158048
SE158072	Nitrate ISE	Range: 1 to 14,000 mg/L or ppm	£338.00	science2education.co.uk/product/SE158072
SE158080	Potassium ISE	Range: 1 to 39,000 mg/L or ppm	£338.00	science2education.co.uk/product/SE158080

Go Direct™ CO_2 Sensor

Explore the difference between photosynthesis and respiration!

Use this sensor in a variety of experiments:

- Measure the change in gas concentration during cellular respiration
- Measure the change in gas concentration during photosynthesis
- Study the effect of temperature on cell respiration or metabolism of organisms
- Investigate artificial selection in yeast by comparing respiration rates of different strains

Code: **SE157920** **£270.00**

The Go Direct CO_2 Gas Sensor measures gaseous carbon dioxide concentration levels, air temperature, and relative humidity. It can be used in a variety of biology experiments. It connects wirelessly via Bluetooth® wireless technology or wired via USB to your device.
Monitor changes in carbon dioxide, temperature, and relative humidity easily with the Go Direct CO_2 Gas Sensor. This sensor includes built-in temperature compensation and humidity protection. A 250mL Nalgene bottle is included for running controlled experiments with small plants and animals.

Technical Specification

- Range: 0–100,000 ppm
- Accuracy: 0 to 1,000 ppm: ±100 ppm, 1,000 to 10,000 ppm: ±5% of reading + 100 ppm, 10,000 ppm to 50,000 ppm: ±10% of
- reading, 50,000 to 100,000 ppm: ±15% of reading
- Resolution: 1 ppm CO_2
- Temperature Sensor, Accuracy: ±0.5°C, Resolution: 0.1°C
- Relative Humidity Sensor, Accuracy: ±5% or better, Resolution: 0.1%

For more information, go to: science2education.co.uk/product/SE157920

Go Direct™ Gas Sensor

Use this sensor in a variety of experiments:

- Test catalase activity under various conditions
- Measure oxygen consumption at rest and after exercise
- Measure the change in gas produced during photosynthesis
- Compare the rates of cell respiration in germinating and non-germinating peas

Code: **SE157944** **£256.00**

The Go Direct O_2 Gas Sensor measures gaseous oxygen concentration levels and air temperature. It is useful for a variety of biology and physiology experiments. It connects wirelessly via Bluetooth® wireless technology or wired via USB to your device. This sensor has a wide measurement range, which is ideal for studying human and cellular respiration. A 250mL Nalgene bottle is included for running controlled experiments with small plants and animals.

Technical Specification

Oxygen Sensor

- Cell type: electrochemical cell
- Range: 0–100% (0–1000 ppt) O_2
- Accuracy (at standard pressure 760 mm Hg): ±1% volume O_2
- Resolution: 0.01% O_2

Temperature Sensor

- Type: thermistor
- Accuracy: ±0.5°C
- Resolution: 0.1°C

BioChamber 2000 Code: **SE106936** **£29.00**

Use with a CO_2 and O_2 Gas Sensor to monitor gaseous carbon dioxide and oxygen levels simultaneously. It's particularly useful when monitoring respiration and photosynthesis.

For more information, go to: science2education.co.uk/product/SE157944

*Warranty excludes battery

Go Direct™ Optical Dissolved Oxygen

No set-up required - simple plug and play!

Use this sensor in a variety of experiments:

- Investigate the relationship between temperature and dissolved oxygen in water
- Measure primary productivity or biological/biochemical oxygen demand
- Explore the interdependence of plants and animals
- Monitor watersheds over time

Code: **SE157952** **£404.00**

*Warranty excludes battery (2 years for cap)

Technical Specification

- Range: 0 to 20mg/L, 0 to 300%

The Go Direct Optical Dissolved Oxygen Probe makes it easy to measure dissolved oxygen concentration, water temperature, and atmospheric pressure.

The Go Direct Optical Dissolved Oxygen Probe combines the power of multiple sensors to measure dissolved oxygen, water temperature, and atmospheric pressure. The Go Direct Optical Dissolved Oxygen Probe uses luminescent technology to provide fast, easy, and accurate results. Perfect for the field or for the laboratory, this probe requires no calibration, no filling solution, no warm-up time, and no stirring. This waterproof probe is ready to sample dissolved oxygen immediately without additional setup or the need to warm it up—so more class time can be spent on the investigation.

For more information, go to: science2education.co.uk/product/SE157952

Go Direct™ Conductivity Probe

Determine ionic content of an aqueous solution

Use this sensor in a variety of experiments:

- Demonstrate diffusion of ions through membranes
- Investigate the difference between ionic and molecular compounds or strong and weak acids
- Measure Total Dissolved Solids (TDS)
- Conductivity studies as a function of temperature

Code: **SE157376** **£134.00**

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

The Go Direct Conductivity Probe features a built-in temperature sensor to simultaneously read conductivity and temperature. Automatic temperature compensation allows students to calibrate the probe in the lab and then make measurements outdoors without temperature changes affecting data. This temperature compensation can be turned off to perform conductivity studies as a function of temperature. An alternating current at its electrodes prevents polarization and electrolysis, reducing contamination of solutions.

Technical Specification

- Range: 0 to 20,000µS/cm (0 to 10,000mg/L TDS)
- Temperature compensation: automatic from 5 to 35°C, can be turned off
- Temperature range (can be placed in): 0 to 80°C
- Cell constant: 1.0cm-¹

For more information, go to: science2education.co.uk/product/SE157376

*Warranty excludes battery

Go Wireless® Heart Rate

No clips, no chest belt, no cable!
Connects by Bluetooth® to your device.

Use this sensor in a variety of experiments:

- Heart rate as a vital sign
- Heart rate and exercise
- Effect of coughing on heart rate
- Heart rate and physical fitness
- Heart rate and body position

Technical Specification

- Battery lifetime: 200 hrs
- Operating temperature: -10 to 50°C
- Wireless range: 10m or more unobstructed

Code: **SE128304** £116.00

The Vernier Go Wireless Heart Rate is ideal for continuously monitoring heart rate before, during, and after exercise or while a person is stationary. Data is wirelessly transmitted to iPad, Android devices, Chromebooks, computers or Mac (Windows 10 or Mac OSx 10.10 with Bluetooth® 4).

- Simple and easy to use
- Displays live heart rate readouts before data collection
- Hand grips do not require electrodes or clips
- Easy to clean and share between students

For more information, go to: science2education.co.uk/product/SE157920

NEW Go Direct Hand Dynamometer

Measure grip and pinch strength.

Code: **SE152760** £148.00

Go Direct Hand Dynamometer can be used to measure grip and pinch strength and to perform muscle fatigue studies. Students can correlate muscle strength and fatigue when they pair Go Direct Hand Dynamometer and Go Direct EKG.

For more information, go to: science2education.co.uk/product/SE152760

*Warranty excludes battery

Tel: 0115 982 2022 – www.science2education.co.uk

Go Direct™ Respiration Monitor Belt

Hands free measurement of respiration rates!

Use this sensor in a variety of experiments:

- Observe how respiration rate changes after exercise or breath holding
- Observe how respiration effort (the force exerted by the chest during respiration) changes after exercise or breath holding
- Measure steps and step rate during a study with the built-in pedometer

Technical Specification

- Range: 0–50N
- Resolution: 0.01N
- Response time: 50ms
- Maximum chest circumference: 140cm

Code: **SE157704** £134.00

Measure human breathing patterns quickly with the Go Direct Respiration Belt, which connects wirelessly via Bluetooth® or wired via USB to your device. Go Direct Respiration Belt uses a force sensor and an adjustable nylon strap around the chest to measure respiration effort and respiration rate. An LED indicator provides feedback so belt tension can be optimised. Respiration rate is reported in the Graphical Analysis™ 4 app, which makes comparison studies between subjects or experiments easy to do.

For more information, go to: science2education.co.uk/product/SE157704

Go Direct™ ECG Sensor

Measure electrical activity in the heart and muscles!

Use this sensor in a variety of experiments:

- Compare and measure students' electrocardiogram (EKG/ECG) waveforms
- Determine heart rate by examining the number of QRS waveforms in a series of electrocardiograms (EKG/ECGs)
- Study contractions of muscles (EMG) in the arm, leg, or jaw
- Correlate measurements of grip strength and electrical activity with muscle fatigue

Technical Specification

- Range: ±200mV
- Resolution: 24µV
- Heart rate calculation: sample windows: 6s, Advance interval: 1s
- Connections wireless: Bluetooth®, wired: USB

Code: **SE157928** £216.00

The Go Direct EKG Sensor records electrical signals produced during heart or muscle contractions.The Go Direct EKG Sensor measures electrical activity in the heart and electrical signals produced during muscle contractions. The wireless options minimize the concern of cables getting caught and tangled during experiments. This sensor provides two separate outputs: one optimized for standard 3-lead EKG tracings and one optimized for surface EMG recordings. EMG recordings can also be rectified automatically by the sensor.

For more information, go to: science2education.co.uk/product/SE157928

*Warranty excludes battery

Fax: 0115 945 5379 – sales@science2education.co.uk

Go Direct™ Gas Pressure Sensor

No more counting bubbles!

5 year Warranty*

Use this sensor in a variety of experiments:

- Investigate Boyle's law
- Investigate Charles' law
- Investigate grip strength and muscle fatigue (using Gas Pressure Bulb, not included)
- Measure the production of oxygen gas produced when hydrogen peroxide is destroyed by the enzyme catalase
- Monitor plant transpiration

Code: **SE157408** **£121.00**

The Gas Pressure Sensor records accurate absolute pressure readings relative to the perfect vacuum reference point inside the sensor, allowing you to go below atmospheric pressure or up to 400kPa. Easily change the displayed units to any one of seven options (kPa, mmHg, inHg, mbar, psi, atm, torr). Includes a syringe, tubing, and stoppers to ease setup for experiments such as Boyle's law.

Technical Specification

- Range: 0 to 400kPa
- Resolution: 0.03kPa
- Accuracy: ±3kPA
- Maximum sampling rate: 50 samples/s
- Internal volume: 0.8mL
- Maximum pressure that the sensor can tolerate without permanent damage: 450kPa
- Connections:
  wireless: Bluetooth®
  wired: USB

Use with Gas Pressure Sensor Bulb (set of 4)

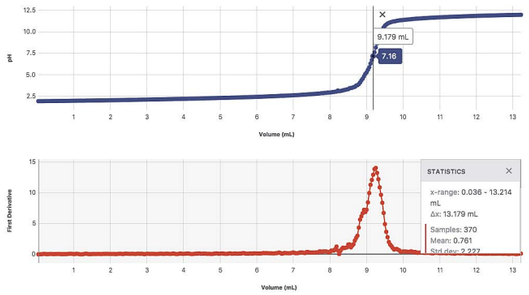
Code: **SE157584** **£27.00**

An affordable, latex and phthalate free accessory, the Gas Pressure Sensor Bulb is designed to easily perform grip strength measurements.

For more information, go to: science2education.co.uk/product/SE157408

Go Direct™ Drop Counter

Conducting a titration has never been easier!



5 year Warranty*

Code: **SE157384** **£134.00**

The Go Direct Drop Counter precisely records the number of drops of titrant added during a titration and then automatically converts it to volume.

Conducting a titration has never been easier. Use Go Direct Drop Counter in conjunction with our other Go Direct sensors, such as Go Direct pH, Go Direct Conductivity, or Go Direct ORP, to perform acid-base, conductometric, or potentiometric titrations.

Designed with a wide drop-detecting area, Go Direct Drop Counter removes the need for precise burette alignment. We've also included a large sensor slot for conventional stick-style sensors and a smaller, adjustable slot for temperature probes.
The adjustable clamp easily fits our Stir Station and most laboratory ring stands and lattices.

For more information, go to: science2education.co.uk/product/SE157384

*Warranty excludes battery

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Go Direct™ Voltage Probe Sensor

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

5 year Warranty*

Use this sensor in a variety of experiments:

- Measure potential difference at various places in series and parallel circuits
- Investigate Ohm's law in simple circuits
- Measure the voltage across a capacitor in RC and RLC circuits

Technical Specification

- Input voltage range: ±20.0V
- Maximum voltage on any input: ±24V
- Typical resolution: 0.5mV
- Input impedance (to ground): 10MΩ

Code: **SE157496** **£94.00**

Use this differential probe to measure the voltage in simple circuits, to study basic principles of electrochemical cells, or to investigate the resistivity of different metals.
With a range of ±15V, this system is ideal for use in "battery and bulb" circuits. Go Direct Voltage is capable of kHz sampling and mV resolution, so you can also use it to capture more difficult electric potentials, such as the electromagnetic field induced in a coil by a moving magnet. This single sensor can take the place of several voltmeters in your classroom.

For more information, go to: science2education.co.uk/product/SE157496

Go Direct™ Energy Sensor

Measure voltage and current easily!

5 year Warranty*

Use this sensor in a variety of experiments:

- Investigate the electrical energy generated by a wind turbine or solar panel
- Explore the effect of load on wind turbine or solar panel output

Technical Specification

- Source Input Potential Range: ±30V
- Source Input Current Range: ±1A
- The voltage channel has a 1M ohm input impedance
- The current channel has a 1 ohm sense resistor

Code: **SE157936** **£121.00**

The Go Direct Energy Sensor quantifies the voltage, current, power, and energy output of small wind turbines and solar panels, such as those used in our KidWind Experiment Kits. It connects wirelessly via Bluetooth® or wired via USB to your device. Simpler to use than a multimeter, the Go Direct Energy Sensor measures the voltage and current of a renewable energy system. Connect a source, such as a small wind turbine or solar panel, and our free Graphical Analysis app calculates the power and energy output. For simple energy measurements, Go Direct Energy includes a fixed load of 30Ω. For more advanced experiments, electrical contacts are built into the sensor to connect to an external load such as the Variable Load, a resistor on Vernier Resistor Board, a water pump, or lights.

For more information, go to: science2education.co.uk/product/SE157936

*Warranty excludes battery

Fax: 0115 945 5379 – sales@science2education.co.uk

Go Direct™ Current Probe

Use to measure electric currents in circuits!

5 year Warranty*

Use this sensor in a variety of experiments:

- Capture small currents like those produced by a magnet falling through a coil
- Use in combination with the Go Direct Voltage Probe to investigate Ohm's law or series and parallel circuits
- Explore RC and RLC circuits

Technical Specification

- Range: +/- 1A and +/- 0.1A
- Maximum non-damaging current: 1.5A and 0.5A
- Typical resolution: 0.031mA and 0.003mA
- Connections:
  wireless: Bluetooth®
  wired: USB

Code: **SE157720** £100.00

The Go Direct Current Probe measures the electric currents in circuits.

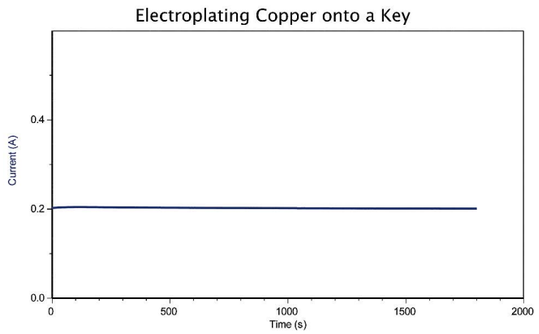
Simplify your experimental setup with the Go Direct Current Probe. It connects wirelessly via Bluetooth® or wired via USB to your device. The wireless connection eliminates additional cables that can clutter the lab bench.

For more information, go to: science2education.co.uk/product/SE157720

Go Direct™ Constant Current System

The Go Direct Constant Current System is a DC power source with a built-in current probe designed for use in electrochemistry.

5 year Warranty*



Code: **SE157360** £103.00

Technical Specification

- Range: 0 to 0.6A
- Supply voltage: 5V DC

Use the Go Direct Constant Current System to determine Avogadro's number and perform various electroplating and electrolysis experiments. This system combines a DC power source with a built-in current sensor to eliminate the need for a separate power supply, and it can deliver up to 0.6A at 5V DC. Voltage settings are automatically adjusted to complement the chosen current setting.

For more information, go to: science2education.co.uk/product/SE157360

*Warranty excludes battery

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Go Direct™ Acceleration

Motion measurement made simple!

5 year Warranty*

Use this sensor in a variety of experiments:

- Measure helmet impacts in concussion-related investigations
- Slip it into your pocket and pirouette or ride a half-pipe
- Mount this accelerometer on your bicycle or affix it to your lab cart without any dragging cables

Technical Specification

- Range:
  Low acceleration: ±157m/s² (±16g)
  High acceleration: ±1,960m/s² (±200g)
- Gyros: ±2,000°/s
- Altimeter: –1,800m to 10,000m (-5,900ft
- to 33,000ft)
- Angle: ±180°

Code: **SE157768** £134.00

Collect acceleration, rotation, and altitude data in the classroom or in the field. Go Direct Acceleration Sensor connects wirelessly via Bluetooth® or wired via USB to your device.

This 3-axis acceleration sensor has two acceleration ranges plus an altimeter and a 3-axis gyroscope. An additional channel measures the angle of the sensor's long axis.

For more information, go to: science2education.co.uk/product/SE157768

Go Direct™ Force and Acceleration Sensor

Measure pushes and pulls in the classroom or outdoors!

5 year Warranty*

Use this sensor in a variety of experiments:

- Investigate Newton's Third Law by connecting the hooks of two force sensors with a rubber band
- Use the force sensor to pull an object across a surface to measure frictional forces
- Attach the force sensor to the Centripetal Force Apparatus to measure centripetal force and acceleration simultaneously
- Place sensors on Dynamics Carts to investigate forces and accelerations in collisions

Technical Specification

- Force: ±50N
- Acceleration: 3 axis, ±16g
- Gyroscope: 3 axis, 2000°/s

Code: **SE157400** £134.00

The Go Direct Force and Acceleration Sensor includes a force sensor, 3-axis accelerometer, and 3-axis gyroscope. Take it on a roller coaster, swing, or slide. Suspend several Go Direct Force and Acceleration Sensors from the ceiling to perform a 3-D vector force experiment, or attach a string to the hook and whirl it in a horizontal or vertical circle. In wireless mode, your imagination is the only limiting factor!

For more information, go to: science2education.co.uk/product/SE157400

*Warranty excludes battery

Fax: 0115 945 5379 – sales@science2education.co.uk

Go Direct™ Motion Detector

Motion measurement made simple!
Either use wirelessly via Bluetooth® or connect via USB

Use this sensor in a variety of experiments:

- Study position, velocity, and acceleration of carts when mounted on a track
- Graph matching: match graphs created in Graphical Analysis 4 software
- Analyse the effects of air resistance on falling coffee filters
- Investigate simple harmonic motion by monitoring a mass on a spring
- Record the motion of a ball
- Record energy in a simple harmonic motion experiment
- Look at classifying collisions as elastic, inelastic, or completely inelastic
- Determining g on an Incline
- Ocean floor mapping
- Determine the spring constant of a real spring

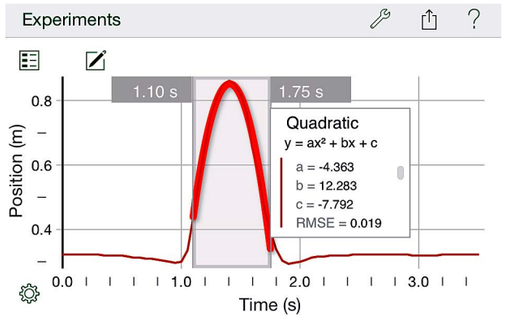
Code: **SE157424** **£134.00**

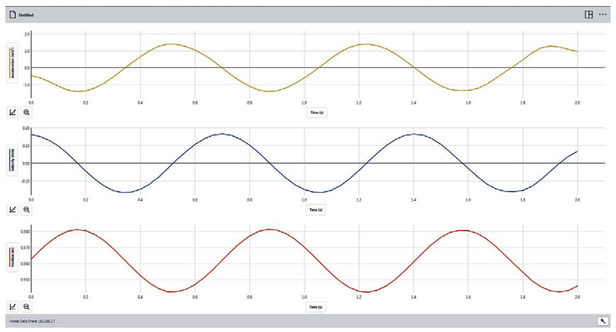
The Go Direct Motion Detector uses ultrasound to measure the position, velocity, and acceleration of moving objects. It directly connects wirelessly via Bluetooth® or wired via USB to your platform.

The Go Direct Motion Detector accurately tracks objects as close as 15cm and as far away as 3.5m. The compact design and wireless capability of this motion detector eliminate the concern of a dangling cable getting in the way.

Technical Specification

- Range: 15cm to 3.5m
- Resolution: 1mm
- Maximum sampling rate: 30 samples/s
- Connections:
  wireless: Bluetooth®
  wired: USB





For more information, go to: science2education.co.uk/product/SE157424

*Warranty excludes battery

Go Direct™ Rotary Motion Sensor

Measure angular motion easily and precisely!

Code: **SE157712** **£243.00**

Use this sensor in a variety of experiments:

- Determine position, velocity, and acceleration of objects in angular motion
- Measure angle increments as small as 0.25°
- Investigate rotational dynamics, conservation of angular momentum, pendulum motion, polarization of light, and more

Technical Specification

- Resolution: 1° or 0.25°
- Optical Encoder: bidirectional, quadrature encoder
- Maximum speed:
- 30rev/s at 1° resolution
- 7.5rev/s at 0.25° resolution
- 3-step Pulley: 10mm, 29mm and 48mm groove diameter, 55mm with O ring in groove

The Go Direct Rotary Motion Sensor measures angular motion. Monitor angular motion easily and precisely with the Go Direct Rotary Motion Sensor, which connects wirelessly via Bluetooth® or wired via USB to your device. The wireless connection eliminates the cables that can get caught and tangled during rotational investigations.

For more information, go to: science2education.co.uk/product/SE157712

Go Direct™ 3-Axis Magnetic Field

The Go Direct 3-Axis Magnetic Field Sensor allows you to determine the magnitude and direction of the magnetic field at any point in space.

Code: **SE157344** **£94.00**

Use this sensor in a variety of experiments:

- Quantify the magnetic field strength of induced magnets
- Determine the declination and inclination
- of the Earth's magnetic field at your location using vector components
- Investigate the relationship between magnetic field strength, coils per unit length, and current in the centre of a solenoid

The Go Direct 3-Axis Magnetic Field Sensor measures the components of the magnetic field along three orthogonal axes. This allows you to determine the magnitude and direction of the magnetic field at any point in space. If desired, measure the field along only two axes, or even one axis, choosing the direction that is best for the experiment.

Technical Specification

- Measurement range: ±5mT and ±130mT
- Operating temperature: –40°C to 85°C
- Dimensions: 19cm long, wand portion 12.2cm long. Designed to be placed inside a solenoid if needed
- Calibration: factory-calibrated, user does not need to calibrate

For more information, go to: science2education.co.uk/product/SE157344

*Warranty excludes battery

Go Direct™ Sound

Capture and evaluate waveforms!

5 year Warranty*

Code: **SE158096** **£121.00**

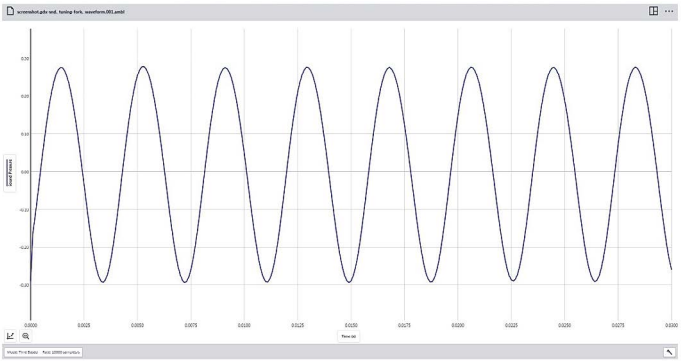
Collect sound data wirelessly with the snap of your fingers. With sound-triggered data collection, Go Direct® Sound provides students with an easy way to capture and evaluate waveforms. Measure wave amplitude and sound intensity level at the same time to investigate the decibel scale, or take the sensor outside the classroom to discover sounds in their natural environment.

Use this sensor in a variety of experiments:

- Speed of sound
- Tuning fork wavelength
- Tuning fork loudness decay
- Investigating beat frequencies

Technical Specification

- Response: A- or C-weighted
- Range: 55–110dB ±3dB
- Sound level frequency range: 30–10,000Hz
- Microphone level frequency range: 100Hz–15kHz



For more information, go to: science2education.co.uk/product/SE158096

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PRICES VALID UNTIL 30th APRIL 2020

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