SCIENCE

SES EDUCATION

Science
Training Lab

About SES

An Edtech industry leader and innovator**, SES Scientific Educational Systems**, goes above and beyond to supply educators and learners with the best educational systems, including **Neulog, Degem Systems, MultiCenter** and **MagiClass.**

Renowned for their ability to cater to numerous fields, sectors and segments, SES systems spread across a wide spectrum, offering unique solutions in the fields of **electronics, microcontrollers, telecommunication, autotronics, mechatronics, pneumatics, hydraulics, CNC machines, refrigeration and air-conditioning, green energy, computerized systems, science, robotics, logger sensors and STEM.**

Each proprietary SES system and device is perfectly designed and manufactured from the highest quality materials in accordance with all safety requirements and regulations. SES is a quality assured firm with the certification of ISO-9001:2015.

SES solutions are used in over 50 countries worldwide by professional developers for high-level technological commercial products and both governmental and private institutions covering educational programs for universities, colleges, vocational training centers and schools, high schools, junior high schools and primary schools.

Science and Experiments

Learning about the laws of nature enable us to understand the processes taking place in nature, and also the technological processes assisted by these laws, such as: the operation of machines, distillation, modern agriculture, electric and electronic systems, and many more.

We measure these processes and phenomena using sensors and data loggers in order to understand the laws of nature better.

NeuLog logger sensors enable us to understand the laws of nature and the processes taking place in nature by:

- Performing science experiments.
- Viewing results in various vision options.
- Operating mathematics manipulations and calculations.

NeuLog provides:

- Over 50 logger sensors for science experiments in Physics, Chemistry, Biology and environment.
- The logger sensor has tiny computer, flash memory and calibrated probe.
- The sensors are plugged to one another with almost no limitation on the composition and number of sensors in the chain.
- Kits for experiments in mechanics, electricity, heat, gas, light, sound and more.
- Configuration sets for primary schools, middle schools and high schools.
- Large number of detailed experiment lessons.
- Very rich and very simple to use software that works on any computer platform (Win, Mac, Tablet, IPAD, smartphone).
- Students can view teacher's experiment on their tablets.

1

Science Studies

- **Physics**
  - Mechanics (statics, dynamics, forces, Newton's laws, energy conversion, momentum and impulse, harmonic motion, distance, velocity, acceleration).
  - Heat (heat sources, temperature, thermal conductivity, thermal expansion, quantity of heat).
  - Fluid mechanics (flow, pressure, liquid pressure, atmospheric pressure, communicating vessels).
  - Sound (sound sources, sound propagation, speed of sound, sound effect on different materials).
  - Radiation and matter (light, propagation of light, the speed of light, optics, waves, matter and energy).
  - Electronics and electromagnetics (the structure of matter, electrons and protons, Ohm's law, Kirchhoff's laws, resistance, electrical current, electromagnetic induction).

- **Biology**
  - Human physiology – structure and biological systems
    - Nutrient intake, metabolism, transport, waste products
    - Signal transduction, processing and reaction
    - Control, regulation, feedback
    - The cell: structure, processes, life cycle
  - Ecology
    - Water, soil, radiation and light, air, temperature
    - Effect of different factors on humans
    - Effect of humans on different factors
    - Agriculture
  - Zoology
    - Senses
    - Animal communication
    - Reproduction
    - Animal behavior
  - Plants
    - The structure of plants
    - Germination
    - Growth
    - Reproduction and fruit production

- **Chemistry**
  - The structure of matter and atom, state of matter, conservation of matter.
  - The periodic table, metals and non-metals, properties of elements.
  - Molecules, covalent bonds, molecular compound properties, melting and dissolution.
  - Atomic lattice properties, metal properties
  - Chemical energy
  - Ratios and quantities, the mole unit, mass, molar concentration, molar volume of gasses, pressure, volume, temperature
  - Oxidation and reduction, corrosion
  - Acids and bases
  - Nutrition, vitamins, minerals, sugars, triglycerides, fatty acids, proteins

Computing Platforms

NeuLog can be operated on many computing platforms – PCs, MAC computers, Linux computers, iPads, tablets and even smart phones.

NeuLog offers single especially friendly software to all platforms. The program also allows exporting data to Excel for further processing. NeuLog software includes many processing functions that perform analysis of results even without export the software.

NeuLog software is very simple and very intuitive. The system does not require any initialization operations before performing experiments. System operation is so immediate, it the not needed user manual included, generally remains untouched.

Direct Connection

NeuLog sensors are connected to the module through the USB adapter to any computer (PC, MAC, Linux) that has a USB connection.

After simple connection, the system is ready to run any application.

Wireless Communication

Computing platforms (iPads, tablets, smart phones, computers) can work with the sensors in wireless Wi-Fi or Bluetooth.

The Wi-Fi module should be connected to a battery module or to a small power adaptor. The Wi-Fi module contains the system software so no software installation is required on the computing platform.

Bluetooth   **Wi-Fi**

Any chain of sensors

The Wi-Fi module can also work as a USB module.

Using the Wi-Fi connection method, a teacher can perform an experiment and all of the students can view the results of the experiment on their computers or tablets simultaneously. This is a unique feature of its kind in the world.

The Bluetooth module contains a 2300mAh rechargeable battery and works through NeuLog application software that can be found in Apple and Google stores.

Operating Without a Computing Platform

Because each sensor is a small computer with memory, experiments can be performed with a battery module connection only. Experiment results are then saved in the sensor flash memory (up to 5 experiments) and can be uploaded to a computer at any time thereafter.
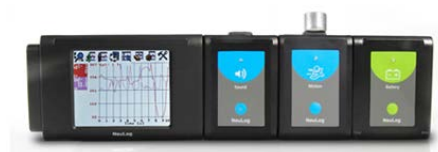
The sensors can be attached to a display module for viewing the results but the processing and storage of the results are made by the sensors themselves.

Panda – 9 Sensors in Hand

The Panda is an excellent primary school tool for environment data collection and experiments in biology, physics and chemistry. With the Panda it is easy to convert feelings and sensation and to explain nature phenomena.

The Panda is a multi-sensor module that includes 9 built-in sensors: **Ambient Temperature, Light, Sound, Barometer, Altitude, Humidity, Dew-Point, Acceleration,** and **Magnetic field**. It also includes a rechargeable battery; a 3.2" (320X240 pixels) color display, a touch screen and a USB connector.

NeuLog sensors can be connected to the Panda in a chain including a GPS module.

The Panda can be connected by wire to a PC or a MAC through USB.

The Panda can also be connected to the Wi-Fi module for wireless communication with PC, MAC, iPads, tablets and smart phones.

How the Panda Works?

The panda is operated by an independent internal firmware for performing experiments and data collection.

In normal mode, the Panda displays the value measured by one of its internal or external sensors at one of the display options:

Digital	Bar	Analog meter	Accumulated graph

In experiment mode, the Panda records in flash memory the values of all the experiment participating sensors. It displays only two sensors' samples at a time. The other values can be displayed at any time.

The Panda computer (PC, MAC or tablet) software, specially designed for primary school, is unique, super friendly and very intuitive to operate and understand.

The Panda and NeuLog programs are based on the 'You See What You Need' software. They can be used easily without any user manual – just 'Plug and Play'.

4

Laboratory sets

NUL-PRIM – Primary school set

Sensors	Description	Qty
NUL-CASE	Case for NeuLog sensor kit	1
PANDA-1	Environment Logger with 9 Sensors, display and Battery Module	1
BAT-202	Battery Module	1
USB-200	USB Module	1
BLT-202	Bluetooth Module (optional)	*
NUL-201	Voltage Logger Sensor	1
NUL-202	Current Logger Sensor	1
NUL-203	Temperature Logger Sensor	2
NUL-204	Light Logger Sensor	1
NUL-206	pH Logger Sensor	1
NUL-208	Pulse Logger Sensor	1
NUL-212	Sound Logger Sensor	1
NUL-213	Motion Logger Sensor	1
NUL-232	UVA Logger Sensor	1

Kits	Description	Qty
ELE-KIT	Electricity kit for physics	1
LGT-KIT	Light kit for physics	1
SND-KIT	Sound kit for physics	1
THR-KIT	Heat kit for physics	1
DST-KIT	Distillation	1
CGG-KIT	Combustion Kit & Gas Generator	1

Primary School Experiments

Exp. No.	Experiment name	Sensor	Sensor name	Kit
P-1	Falling Objects	NUL-213	Motion	MEC-KIT
P-2	Motion Studies	NUL-213	Motion	MEC-KIT
P-10	Ohm's Law	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-11	How Incandescent Light Bulbs Work?	NUL-202 NUL-204	Current Light	ELE-KIT
P-24	Circuits and Serial Resistance	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-28	An Electric Current in Closed and Opened Circuits	NUL-202	Current	ELE-KIT
P-19	Sound Rate	NUL-212	2 Sound	SND-KIT
P-21	Sound Waves and Musical Notes	NUL-212	Sound	SND-KIT
P-22	Sound Beats	NUL-212	Sound	SND-KIT
P-26	Exploring Sound	NUL-212	Sound	SND-KIT
P-29	Sound Isolation	NUL-212	Sound	SND-KIT
P-30	Tuning Forks and Resonance Boxes	NUL-212	Sound	SND-KIT
P-33	Sound waves	NUL-212	Sound	SND-KIT
P-23	Light intensity and distance	NUL-204	Light	LGT-KIT
P-31a	Light Absorption and Heat	NUL-203	2 Temperature	LGT-KIT
P-40	Colors of Light	NUL-204	Light	LGT-KIT
P-41	Light and Shadow	NUL-204	Light	LGT-KIT
P-42	Light and Dark colors	NUL-204	Light	LGT-KIT
P-38	Thermal conductivity	NUL-203	3 Temperature	THR-KIT
C-1	Producing Electricity	NUL-201	Voltage	UTL-KIT
C-2	Solar Cells	NUL-201 NUL-204	Voltage Light	LGT-KIT
C-17	Evaporation	NUL-203	Temperature	UTL-KIT
C-18	Endothermic and Exothermic reactions – part 1	NUL-203	Temperature	UTL-KIT
C-15	Distillation – part 1	NUL-203	Temperature	DST-KIT
C-16	Distillation – part 2	NUL-203	Temperature	DST-KIT
C-8	Acid Rain	NUL-206	pH	CGG-KIT
B-8	Solar Oven	NUL-203	Temperature	None
B-18	Heart Rate and Coughing	NUL-208	Heart rate & pulse	None
B-19	Heart Rate and Physical Activity	NUL-208	Heart rate & pulse	None
B-32	Ultra violet light sunscreen protection	NUL-204 NUL-232	Light UVA	None
S-1	Light at different environments	Panda	Light	None
S-3	Relative humidity at different environments	Panda	Humidity	None
S-5	Sound levels	Panda	Sound	None
S-8	Temperature at different environments	Panda	Temperature	None
S-11	Barometric pressure and altitude	Panda	Barometer	None
S-13	Magnets	Panda	Magnetic field	MAG-KIT
S-16	Acceleration in everyday life	Panda	Acceleration	None
S-19	Dew point and dew formation	Panda	Dew point	None

NUL-MID – Middle school set

Sensors	Description	Qty
NUL-CASE	Case for NeuLog sensor kit	1
VIEW-101	Viewer Graphic Color Display Module	1
BAT-202	Battery Module	1
USB-200	USB Module	1
BLT-202	Bluetooth Module (optional)	*
WIFI-202	Wi-Fi Communication Module (optional)	*
NUL-201	Voltage Logger Sensor	1
NUL-202	Current Logger Sensor	1
NUL-203	Temperature Logger Sensor	2
NUL-204	Light Logger Sensor	1
NUL-205	Oxygen Logger Sensor	1
NUL-206	pH Logger Sensor	1
NUL-208	Pulse Logger Sensor	1
NUL-209	Photo gate Logger Sensor	2
NUL-211	Force Logger Sensor	1
NUL-212	Sound Logger Sensor	1
NUL-213	Motion Logger Sensor	1
NUL-219	Colorimeter Logger Sensor	1
NUL-220	CO_2 Logger Sensor	1
NUL-231	Turbidity Logger Sensor	1

Kits	Description	Qty
MEC-KIT	Mechanics kit for physics	1
UTL-KIT	Utility kit	1
ELE-KIT	Electricity kit for physics	1
LGT-KIT	Light kit for physics	1
SND-KIT	Sound kit for physics	1
THR-KIT	Heat kit for physics	1
DST-KIT	Distillation	1
CGG-KIT	Combustion Kit & Gas Generator	1
MAG-KIT	Magnets Kit	1

Middle School Experiments

Exp. No.	Experiment name	Sensor	Sensor name	Kit
P-1	Falling Objects	NUL-213	Motion	MEC-KIT
P-2	Motion Studies	NUL-213	Motion	MEC-KIT
P-3	Motion Parameters of a Moving Cart	NUL-213	Motion	MEC-KIT
P-4	Newton's Second Law	NUL-213	Motion	MEC-KIT
P-5	Gravity Acceleration on an Inclined Plane	NUL-213	Motion	MEC-KIT
P-6	Friction Force	NUL-211	Force	MEC-KIT
P-7	Levers	NUL-211	Force	MEC-KIT
P-8	Pulley Systems	NUL-211	Force	MEC-KIT
P-9	An inclined plane	NUL-211	Force	MEC-KIT
P-17	Magnetic Field Strength	NUL-214	Magnetic field	MEC-KIT
P-35	Velocity of Free Falling Objects	NUL-209	Photo gate	MEC-KIT
P-36	Acceleration of Free Falling Objects	NUL-209	Photo gate	MEC-KIT
P-49	Horizontal Launched Projectile Motion	NUL-209	Photo gate	MEC-KIT
P-10	Ohm's Law	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-11	How Incandescent Light Bulbs Work?	NUL-202 NUL-204	Current Light	ELE-KIT
P-16	Basic Electromagnetism	NUL-202 NUL-214	Current Magnetic field	ELE-KIT
P-24	Circuits and Serial Resistance	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-27	Current Variations and Generation of a Magnetic Field	NUL-202 NUL-214	Current Magnetic field	ELE-KIT
P-28	An Electric Current in Closed and Opened Circuits	NUL-202	Current	ELE-KIT
P-23	Light intensity and distance	NUL-204	Light	LGT-KIT
P-31a	Light Absorption and Heat	NUL-203	2 Temperature	LGT-KIT
P-40	Colors of Light	NUL-204	Light	LGT-KIT
P-41	Light and Shadow	NUL-204	Light	LGT-KIT
P-42	Light and Dark colors	NUL-204	Light	LGT-KIT
P-19	Sound Rate	NUL-212	2 Sound	SND-KIT
P-21	Sound Waves and Musical Notes	NUL-212	Sound	SND-KIT
P-22	Sound Beats	NUL-212	Sound	SND-KIT
P-26	Exploring Sound	NUL-212	Sound	SND-KIT
P-29	Sound Isolation	NUL-212	Sound	SND-KIT
P-30	Tuning Forks and Resonance Boxes	NUL-212	Sound	SND-KIT
P-33	Sound waves	NUL-212	Sound	SND-KIT
P-38	Thermal conductivity	NUL-203	3 Temperature	THR-KIT
P-17	Magnetic Field Strength	NUL-214	Magnetic field	MAG-KIT
P-52	Magnetic Field	NUL-214	Magnetic field	MAG-KIT
C-1	Producing Electricity	NUL-201	Voltage	UTL-KIT
C-2	Solar Cells	NUL-201 NUL-204	Voltage Light	UTL-KIT
C-3	Ions in Solution	NUL-215	Conductivity	UTL-KIT
C-4	Conductivity of Solutions	NUL-215	Conductivity	UTL-KIT
C-6	Gas Solubility	NUL-205	Oxygen	UTL-KIT
C-7	Common Acids and Bases	NUL-206	pH	UTL-KIT
C-8	Acid Rain	NUL-206	pH	UTL-KIT
C-12	The Acidity in soft drinks	NUL-206	pH	UTL-KIT
C-15	Distillation – part 1	NUL-203	Temperature	UTL-KIT
C-16	Distillation – part 2	NUL-203	Temperature	UTL-KIT
C-17	Evaporation	NUL-203	3 Temperature	UTL-KIT
C-18	Endothermic and Exothermic reactions – part 1	NUL-203	Temperature	UTL-KIT
C-19	Endothermic and Exothermic reactions – part 2	NUL-203 NUL-206	Temperature pH	UTL-KIT

Exp. No.	Experiment name	Sensor	Sensor name	Kit
C-24	Chemical Reactions	NUL-205	Oxygen	UTL-KIT
C-28	Beer–Lambert law	NUL-219	Colorimeter	UTL-KIT
C-31	Color Absorption	NUL-219	Colorimeter	UTL-KIT
C-15	Distillation – part 1	NUL-203	Temperature	DST-KIT
C-16	Distillation – part 2	NUL-203	Temperature	DST-KIT
C-5	Combustion	NUL-205	Oxygen	CGG-KIT
C-8	Acid Rain	NUL-206	pH	CGG-KIT
B-2	Diffusion in Biology	NUL-215	Conductivity	UTL-KIT
B-4	Enzymatic Activity of Catalase	NUL-205	Oxygen	UTL-KIT
B-5	Aerobic Respiration	NUL-206	pH	UTL-KIT
B-11	Respiration of Germinating Seeds	NUL-220	CO_2	UTL-KIT
B-16	Measuring Particles in Air	NUL-204	Light	UTL-KIT
B-24	Water Treatment and Turbidity	NUL-231	Turbidity	UTL-KIT
B-25	Water Quality Turbidity	NUL-231	Turbidity	UTL-KIT
B-36	Quality of Water	NUL-203 NUL-205 NUL-206 NUL-215 NUL-231	Temperature Oxygen pH Conductivity Turbidity	UTL-KIT
B-38	Monitoring Yeast Growth	NUL-231	Turbidity	UTL-KIT
B-46	Photosynthesis Chamber	NUL-205 NUL-220	Oxygen CO_2	CGG-KIT
B-3	Respiration	NUL-205	Oxygen	None
B-8	Solar Oven	NUL-203	2 Temperature	None
B-10	Photosynthesis	NUL-220	CO_2	None
B-18	Heart Rate and Coughing	NUL-208	Heart rate & pulse	None
B-19	Heart Rate and Physical Activity	NUL-208	Heart rate & pulse	None

9

NUL-HIGH – High School Set

Sensors	Description	Qty
NUL-CASE	Case for NeuLog sensor kit	2
VIEW-101	Viewer Graphic Color Display Module	1
BAT-202	Battery Module	1
USB-200	USB Module	1
BLT-202	Bluetooth Module (optional)	*
WIFI-202	Wi-Fi Communication Module (optional)	*
NUL-201	Voltage Logger Sensor	1
NUL-202	Current Logger Sensor	1
NUL-203	Temperature Logger Sensor	2
NUL-204	Light Logger Sensor	1
NUL-205	Oxygen Logger Sensor	1
NUL-206	pH Logger Sensor	1
NUL-208	Pulse Logger Sensor	1
NUL-209	Photo gate Logger Sensor	2
NUL-210	Pressure Logger Sensor	1
NUL-211	Force Logger Sensor	1
NUL-212	Sound Logger Sensor	1
NUL-213	Motion Logger Sensor	1
NUL-217	Galvanic Skin Response (GSR) Logger Sensor	1
NUL-218	EKG Logger Sensor	1
NUL-219	Colorimeter Logger Sensor	1
NUL-220	CO_2 Logger Sensor	1
NUL-230	UVB Logger Sensor	1
NUL-231	Turbidity Logger Sensor	1
NUL-232	UVA Logger Sensor	1
NUL-246	Charge Logger Sensor	1

Kits	Description	Qty
MEC-KIT	Mechanics kit for physics	1
UTL-KIT	Utility kit	1
ELE-KIT	Electricity kit for physics	1
LGT-KIT	Light kit for physics	1
SND-KIT	Sound kit for physics	1
THR-KIT	Heat kit for physics	1
GAS-KIT	Gas kit for physics	1
DST-KIT	Distillation	1
CGG-KIT	Combustion Kit & Gas Generator	1
MAG-KIT	Magnets Kit	1

High School Experiments

Exp. No.	Experiment name	Sensor	Sensor name	Kit
P-1	Falling Objects	NUL-213	Motion	MEC-KIT
P-2	Motion Studies	NUL-213	Motion	MEC-KIT
P-3	Motion Parameters of a Moving Cart	NUL-213	Motion	MEC-KIT
P-4	Newton's Second Law	NUL-213	Motion	MEC-KIT
P-5	Gravity Acceleration on an Inclined Plane	NUL-213	Motion	MEC-KIT
P-6	Friction Force	NUL-211	Force	MEC-KIT
P-7	Levers	NUL-211	Force	MEC-KIT
P-8	Pulley Systems	NUL-211	Force	MEC-KIT
P-9	An inclined plane	NUL-211	Force	MEC-KIT
P-17	Magnetic Field Strength	NUL-214	Magnetic field	MEC-KIT
P-35	Velocity of Free Falling Objects	NUL-209	Photo gate	MEC-KIT
P-36	Acceleration of Free Falling Objects	NUL-209	Photo gate	MEC-KIT
P-49	Horizontal Launched Projectile Motion	NUL-209	Photo gate	MEC-KIT
P-14	Measurements of UVB Radiation	NUL-230	UVB	UTL-KIT
P-10	Ohm's Law	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-11	How Incandescent Light Bulbs Work?	NUL-202 NUL-204	Current Light	ELE-KIT
P-16	Basic Electromagnetism	NUL-202 NUL-214	Current Magnetic field	ELE-KIT
P-24	Circuits and Serial Resistance	NUL-201 NUL-202	Voltage Current	ELE-KIT
P-27	Current Variations and Generation of a Magnetic Field	NUL-202 NUL-214	Current Magnetic field	ELE-KIT
P-28	An Electric Current in Closed and Opened Circuits	NUL-202	Current	ELE-KIT
P-23	Light intensity and distance	NUL-204	Light	LGT-KIT
P-31a	Light Absorption and Heat	NUL-203	2 Temperature	LGT-KIT
P-40	Colors of Light	NUL-204	Light	LGT-KIT
P-41	Light and Shadow	NUL-204	Light	LGT-KIT
P-42	Light and Dark colors	NUL-204	Light	LGT-KIT
P-19	Sound Rate	NUL-212	2 Sound	SND-KIT
P-21	Sound Waves and Musical Notes	NUL-212	Sound	SND-KIT
P-22	Sound Beats	NUL-212	Sound	SND-KIT
P-26	Exploring Sound	NUL-212	Sound	SND-KIT
P-29	Sound Isolation	NUL-212	Sound	SND-KIT
P-30	Tuning Forks and Resonance Boxes	NUL-212	Sound	SND-KIT
P-33	Sound waves	NUL-212	Sound	SND-KIT
P-18	Volume Changes and Gas Pressure	NUL-210	Pressure	GAS-KIT
P-38	Thermal conductivity	NUL-203	Temperature	THR-KIT
P-17	Magnetic Field Strength	NUL-214	Magnetic field	MAG-KIT
P-52	Magnetic Field	NUL-214	Magnetic field	MAG-KIT
P-44	Static Electricity	NUL-246	Charge	None
C-1	Producing Electricity	NUL-201	Voltage	UTL-KIT
C-2	Solar Cells	NUL-201 NUL-204	Voltage Light	UTL-KIT
C-3	Ions in Solution	NUL-215	Conductivity	UTL-KIT
C-4	Conductivity of Solutions	NUL-215	Conductivity	UTL-KIT
C-6	Gas Solubility	NUL-205	Oxygen	UTL-KIT
C-7	Common Acids and Bases	NUL-206	pH	UTL-KIT
C-8	Acid Rain	NUL-206	pH	UTL-KIT
C-12	The Acidity in soft drinks	NUL-206	pH	UTL-KIT
C-15	Distillation – part 1	NUL-203	Temperature	UTL-KIT
C-16	Distillation – part 2	NUL-203	Temperature	UTL-KIT
C-17	Evaporation	NUL-203	3 Temperature	UTL-KIT

Exp. No.	Experiment name	Sensor	Sensor name	Kit
C-18	Endothermic and Exothermic reactions – part 1	NUL-203	Temperature	UTL-KIT
C-19	Endothermic and Exothermic reactions – part 2	NUL-203 NUL-206	Temperature pH	UTL-KIT
C-24	Chemical Reactions	NUL-205	Oxygen	UTL-KIT
C-28	Beer–Lambert law	NUL-219	Colorimeter	UTL-KIT
C-30	Boyle's law	NUL-210	Pressure	UTL-KIT
C-31	Color Absorption	NUL-219	Colorimeter	UTL-KIT
C-14	Gay-Lussac's Law	NUL-203 NUL-210	Temperature Pressure	GAS-KIT
C-15	Distillation – part 1	NUL-203	Temperature	DST-KIT
C-16	Distillation – part 2	NUL-203	Temperature	DST-KIT
C-5	Combustion	NUL-205	Oxygen	CGG-KIT
C-8	Acid Rain	NUL-206	pH	CGG-KIT
B-2	Diffusion in Biology	NUL-215	Conductivity	UTL-KIT
B-4	Enzymatic Activity of Catalase	NUL-205	Oxygen	UTL-KIT
B-5	Aerobic Respiration	NUL-206	pH	UTL-KIT
B-7	Enzyme activity	NUL-203 NUL-210	Temperature Pressure	UTL-KIT
B-11	Respiration of Germinating Seeds	NUL-220	CO_2	UTL-KIT
B-16	Measuring Particles in Air	NUL-204	Light	UTL-KIT
B-24	Water Treatment and Turbidity	NUL-231	Turbidity	UTL-KIT
B-25	Water Quality Turbidity	NUL-231	Turbidity	UTL-KIT
B-36	Quality of Water	NUL-203 NUL-205 NUL-206 NUL-215 NUL-231	Temperature Oxygen pH Conductivity Turbidity	UTL-KIT
B-37	Emotional Stress Measurement	NUL-217	GSR	UTL-KIT
B-38	Monitoring Yeast Growth	NUL-231	Turbidity	UTL-KIT
B-3	Respiration	NUL-205	Oxygen	None
B-8	Solar Oven	NUL-203	2 Temperature	B-08
B-10	Photosynthesis	NUL-220	CO_2	None
B-18	Heart Rate and Coughing	NUL-208	Heart rate & pulse	None
B-19	Heart Rate and Physical Activity	NUL-208	Heart rate & pulse	None
B-40	Electrocardiogram Measurement	NUL-218	ECG	None
E-6	Rayleigh Scattering	NUL-204 NUL-230 NUL-232	Light UVB UVA	

Appendix A – NeuLog™ modules

A.1 Accessory Modules

Catalog No.	Module	Module symbol	Photographic image	Purpose
BAT-202	Battery Module 2300mAh			Powers logger sensors when not connected to PC or Monitor Display Unit
USB-200	USB Bridge Module			Connects logger sensors to PC
VIEW-200	Digital display module			For digital logger sensor data display
VIEW-101	Graphic display module			For programming of logger sensors & graphic display
BLT-202	Bluetooth module			Connects sensors with computers and tablets using Bluetooth technology
WIFI-202	Wi-Fi communication module			Connects sensors with computers and tablets using Wi-Fi technology
RF-201	RF communication module			Allows remote operation of all NeuLog sensors

13

A.2 Logger Sensors Modules

Catalog No.	Module	Module symbol	Photographic image	Purpose
NUL-201	Voltage logger sensor	± 20V		Measures voltage in DC and AC circuits
NUL-202	Current logger sensor	+2.5A		Measures current in DC and AC circuits
NUL-203	Temperature logger sensor			Measures temperature
NUL-204	Light logger sensor			Measures level of Illumination
NUL-205	Oxygen logger sensor	O_2		Measures % oxygen in air and dissolved in water
NUL-206	pH logger sensor			Measures pH
NUL-207	Relative Humidity logger sensor			Measures relative humidity
NUL-208	Heart Rate & Pulse logger sensor			Measures pulse rate and blood flow
NUL-209	Photo/Light gate logger sensor			Measures time and, indirectly, speed/velocity and acceleration

Catalog No.	Module	Module symbol	Photographic image	Purpose
NUL-210	Pressure logger sensor			Measures gas or air pressure
NUL-211	Force logger sensor			Measures forces, both push and pull
NUL-212	Sound logger sensor			Measures sound level and displays waveforms
NUL-213	Motion logger sensor			Measures distance, velocity and acceleration
NUL-214	Magnetic logger sensor			Measures magnetic field intensity
NUL-215	Conductivity logger sensor			Measures solution conductivity
NUL-216	Spirometer logger sensor			Measures lung air flow and volume
NUL-217	GSR logger sensor			Measures Galvanic Skin Response
NUL-218	Electrocardiogram logger sensor			Measures electrocardiogram
NUL-219	Colorimeter logger sensor			Measures solution RGB color transfer and absorbance

Catalog No.	Module	Module symbol	Photographic image	Purpose
NUL-220	CO₂ logger sensor			Measures CO_2 in air
NUL-221	Barometer logger sensor			Measures air pressure and altitude
NUL-222	Blood pressure logger sensor			Measures blood pressure
NUL-223	Drop Counter logger sensor			Counts falling drops
NUL-224	Flow logger sensor			Measures water flow
NUL-225	Force plate logger sensor			Measures high weight
NUL-226	Rotary motion logger sensor			Measures rotary speed, acceleration and rounds
NUL-227	Acceleration logger sensor			Measures 3D acceleration
NUL-228	Salinity logger sensor			Measures salt content in a solution
NUL-229	Soil moisture logger sensor			Measures soil moisture

16

Catalog No.	Module	Module symbol	Photographic image	Purpose
NUL-230	UVB logger sensor			Measures UVB radiation
NUL-231	Turbidity logger sensor			Measures solution turbidity
NUL-232	UVA logger sensor			Measures UVA radiation
NUL-233	Surface temperature logger sensor			Measures temperature of a surface
NUL-234	Wide range temperature logger sensor			Measures a wide range of temperature levels
NUL-235	Infrared thermometer logger sensor			Measures temperature remotely
NUL-236	Respiration monitor belt logger sensor			Measures the breathing of a subject
NUL-237	Hand dynamometer logger sensor			Measures the pressing force
NUL-238	Calcium logger sensor	Ca^{2+}		Measures the concentration of ionic calcium (Ca^{2+})
NUL-239	Chloride logger sensor	Cl^-		Measures the concentration of chloride ions (Cl^-)
NUL-240	Ammonium logger sensor	NH_4^+		Measures the concentration of ammonium ions (NH_4^+)

17

Catalog No.	Module	Module symbol	Photographic image	Purpose
NUL-241	Nitrate logger sensor	NO_3^-		Measures the concentration of nitrate ions (NO_3^-)
NUL-242	Anemometer logger sensor			Measures the velocity of the wind
NUL-243	GPS position logger sensor			Determines latitude, longitude, altitude and horizontal velocity anywhere on Earth
NUL-245	Dew point logger sensor			Gives the temperature below which water vapor condenses into liquid water
NUL-246	Charge logger sensor			Measures electrostatic charges
NUL-247	Geiger logger sensor			Measures radiation
NUL-248	Current logger sensor			Measures current in the mA range
NUL-249	Resistance logger sensor	R		Measures current through the resistance and voltage on it
NUL-251	±25V Voltage logger sensor	±25V		Measures voltage in DC and AC circuits
NUL-258	ORP logger sensor			Measures if a substance is a strong oxidizing agent or a strong reducing agent

Appendix B – Experiment Kits

MEC-KIT – Mechanics Kit for Physics

Classical mechanics is the study of bodies in motion (and at rest), under the action of a system of forces, according to general principles that were first stated in the seventeenth century. Classical mechanics was the first branch of physics that was developed. It has important applications to other branches of physics and also in other areas of science such as astronomy, chemistry, biology, geology and engineering.

The NeuLog Mechanics Kit includes the essential items for learning mechanics. Along with the NeuLog logger sensors (not included), the kit is designed to provide a simple and intuitive learning experience.
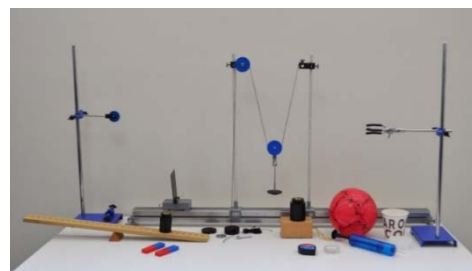
The kit allows the study of:

- The effect of air resistance force on the falling time and velocity of objects (a paper baking cup and a paper cup).
- Motion parameters of a bouncing rubber ball.
- Motion parameters while moving.
- The relationship between distance velocity and acceleration by using a cart on a track.
- The relationship between force, mass and acceleration (according to Newton's second law) by using a cart on a track.
- Gravity acceleration and forces on an inclined plane.
- Friction force by using a wooden block, which is smooth on one side and rough on the other side.
- The dependence of the effort force on the lever's load arm length and effort arm length.
- Characteristics of a fixed and loose pulley.
- The relationship between magnetic field strength and distance.
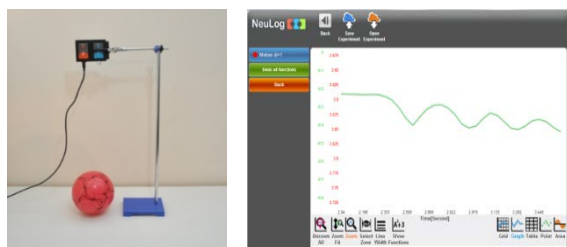- Motion of a simple pendulum.
- Additional topics such as outdoors light intensity (including UV measurements), Relative humidity and temperature variations.

The kit consists of:

- Two utility stands
- Three right angle clamps
- Extension clamp
- Two paper baking cups
- Paper cup
- Ball
- Ball pump
- 3 m measuring tape
- Sell tape
- 1 meter track
- Two track riders
- Two track legs
- Cart with hook
- Reflector plate
- Two 20" rods
- Two magnets in plastic cases
- Rod with pulley
- Rod with pulley (perpendicular)
- Pulley with hook
- Two boss heads
- Thread
- Slotted mass hanger
- Slotted mass holder rod (for the cart)
- Two 10 g slotted masses
- Three 50 g slotted masses
- Two 100 g slotted masses
- 500 g mass
- 1000 g mass
- 60 cm wooden lever ruler
- Fulcrum
- Rough and smooth wooden block with hook
- Two postal rubber bands
- Activities

Experiment example:

The graph demonstrates the motion of a bouncing ball by using a motion logger sensor pointing down. When the ball bounces back up, it reaches a height that is less than its original height due to energy loss.

NeuLog sensors and modules required (not included):

- Motion logger sensor
- Force logger sensor
- Photo gate logger sensor
- Rotary motion logger sensor
- Magnetic field logger sensor
- Battery module (optional)
- Sensors for additional experiments (optional): Temperature, Light, UVB, UVA and Relative humidity logger sensors

19

UTL-KIT – Utility Kit

NeuLog logger sensors greatly improve the teaching of chemistry, biology and environmental science. With NeuLog Utility accessories, a wide variety of topics can be practically studied. The utility accessories are fully customized to the use of logger sensors, and for a high quality learning experience.

The kit allows the study of:

Chemistry topics:

- Electrochemical cells by using a lemon and different combinations of electrodes.
- Oxygen solubility in water.
- Changes in temperature due to evaporation.
- Endothermic and exothermic reactions.
- Beer-Lambert law; the relationship between the concentration of a solution and its absorbance.
- Electrical conductivity of solutions
- pH of household substances
- Action of a buffer solution
- Titration of acids and bases

Biology topics:

- Diffusion
- Photosynthesis and respiration
- Enzymatic activity
- Perspiration
- Fermentation
- Quality of water

Environmental science topics:

- Properties of sea water and fresh water
- Dew point

Experiment example:
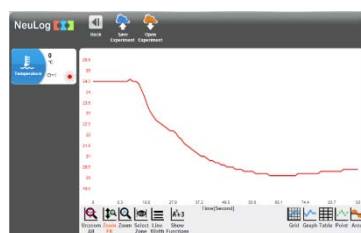
Baking soda was added to the vinegar

The graph demonstrates an endothermic reaction of vinegar and baking soda using a Temperature logger sensor. The temperature decreases as energy is absorbed from the surroundings.

The kit consists of:

- Utility stand
- Burette
- Alcohol lamp
- Four 50 ml beakers
- 100 ml conical flask
- Forty cotton pads
- 50 ml syringe
- Carbon pencil
- Aluminum foil strip
- Iron nail
- Copper cable
- Wash bottle
- Scissors
- Ruler
- Six 18 X 150 mm tubes
- Six Perforated caps
- Funnel
- Plastic container
- Cellotape
- Six sample containers
- Dialysis tubing
- Black marker
- 250 ml beaker
- Two clips
- 10 ml graduated cylinder
- Tube rack
- Activities

NeuLog sensors required (not included):

- Voltage logger sensor
- Oxygen logger sensor
- pH logger sensor
- Temperature logger sensor
- Colorimeter logger sensor
- Conductivity logger sensor
- Salinity logger sensor
- CO_2 logger sensor
- Relative humidity logger sensor
- Pressure logger sensor
- Turbidity logger sensor
- Drop counter logger sensor
- Dew point logger sensor
- Battery module (optional)

ELE-KIT – Electricity Kit for Physics

Electricity is very fundamental for any basic physics course, but performing electricity experiments is sometimes complicated and requires complex and expensive equipment. This simple kit combined with NeuLog logger sensors allows students to investigate this field.

Ohm's law applies to electrical circuits; it states that the current flowing through the circuit is directly proportional to the voltage and inversely proportional to the resistance. In this experiment you will be able to find out this voltage – current dependence by applying a variable voltage to a given resistance and measuring the generated electric current.
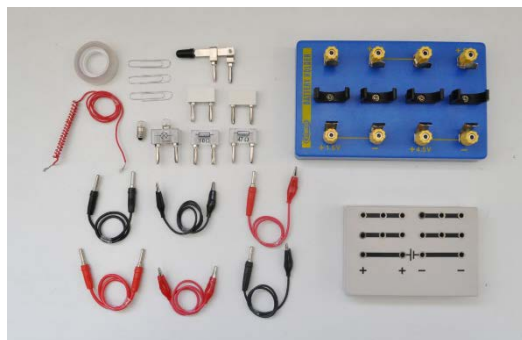
In an incandescent lamp, electric current flows through a thin thread called filament. The current heats this filament reaching approximately 3,000°C and this causes the production of heat as well as light. This experiment studies how long it takes the light bulb to finally radiate light, from the moment current (electrons) begins to flow through the circuit. These and other basic and advanced experiments can be easily conducted using this kit and logger sensors.

This kit allows the study of:

- Basic electricity circuits
- Circuits in series and parallel
- Ohm's Law
- Transformation of electric energy to light
- Electromagnets (using a wire wound on a nail)

The kit consists of:

- Utility stand
- Circuit board
- 6V cell holder
- Four 1.5V batteries
- Knife switch
- Two bridges
- Red 4mm connector cable
- Black 4mm connector cable
- Red crocodile clip cable
- Black crocodile clip cable
- Red crocodile clip and 4 mm connector cable
- Black crocodile clip and 4 mm connector cable
- 10Ω mounted resistor
- 47Ω mounted resistor
- Two mounted bulb holder
- Four 6V bulbs
- 1m electrical wire
- Large iron nail
- Cellotape
- Three paper clips
- Activities

NeuLog sensors required (not included):

- Voltage logger sensor
- Current logger sensor
- Light logger sensor
- Magnetic logger sensor
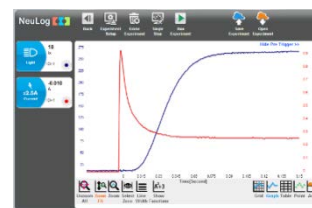
The graph demonstrates how electric energy transforms into light energy.
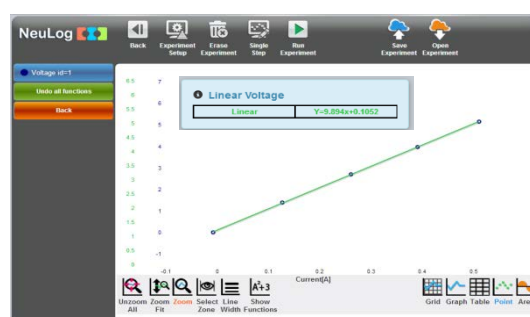
The graph demonstrates Ohm's Law: the current is proportional to the voltage. The slope of the graph is the resistance.

LGT-KIT – Light Kit for Physics

Visible light waves are seen by the human eye as different colors. They are characterized by their wavelength which is the distance between any two corresponding points on successive waves. The length of the wave determines the amount of energy it has; the shorter the wavelength, the higher the energy.

Light can be directly absorbed by an object, reflected at the surface or transmitted through it. The electromagnetic spectrum which is visible to us is in the range of 400-700 nm.

When visible light with an energy distribution similar to sunlight (light of all colors) completely reflects from an object, this light appears white to the human eye. When the object completely absorbs all the light, it is recognized as black. With this kit, students will learn about these and more light principles.

A solar cell is a device that converts sunlight energy directly into electrical energy by the photovoltaic effect. This kit, together with a voltage sensor, and a light sensor allows students to investigate the electricity generated from the irradiation of light.

The kit allows the study of:

- Colored light
- Absorption and reflection of light by different objects
- Shadows
- Photovoltaic cells
- Light intensity and distance
- Absorption of UV light by different sunscreens

The kit consists of:

- Photovoltaic cell
- Two microscope slides
- Utility stand
- Right angle clamp
- Extension clamp
- Ruler
- Cellotape
- Four colored flashlights (Colorless, Blue, Green and Red) with batteries
- Four colored filters (Colorless, Blue, Green and Red)
- White paper
- Black paper
- Grey paper
- Thin box for shadow experiments

NeuLog sensors required (not included):

- Light logger sensor
- Voltage logger sensor
- UVB logger sensor (optional)
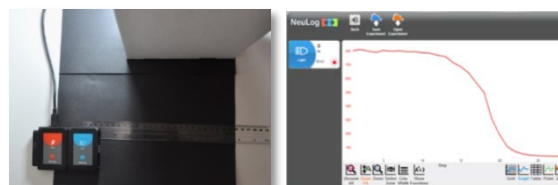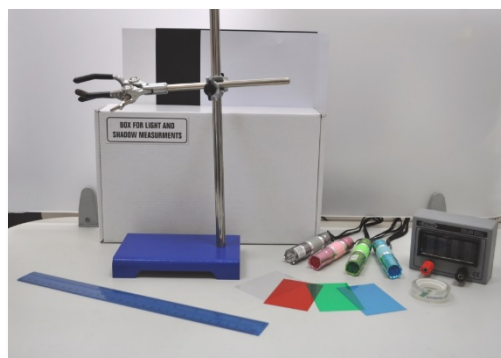
The graph shows light measurements along a shadow. The measured value was around 800 lx while the sensor was in the unblocked region. As it entered into the penumbra region, light intensity started to decrease. When the sensor entered the umbra region it was fully blocked by the box and the light intensity stabilized on around 40 lx.

The graph shows the voltage generated by light irradiation of a fluorescent lamp with different filters.

Light (ID=1) [lx]	Manual Values
860	White
376	Grey
81	Black

The table consists of light measurements done with a light sensor which was aimed to different colors of paper (white, grey and black). A lamp was also aimed towards the papers.

GAS-KIT – Gas kit for physics

An ideal gas can be characterized by three parameters: volume, pressure and temperature for a certain amount of gas.

Maybe the first problem with this gas law is its name. When students hear the term ideal gas law, they interpret that in reality this law does not describe correctly the behavior of gases. Actually, real gases usually do agree with the predictions of the ideal gas equation to within 5%.

This kit allows students to investigate, with the help of logger sensors, the dependence of pressure on a gas (air) with changes in temperature and volume.

The kit contains a metallic cylinder with inlets to measure gas temperature and pressure through sensors and an inlet for a syringe to change the total volume of the gas (air).

This kit allows the study of:

- Gas pressure as a function of volume
- Gas pressure as a function of temperature
- Linear fitting on a graph
- Extrapolation

The kit consists of:

- Gas study device (55ml volume)
- Three perforated rubber stoppers
- Non-perforated rubber stopper
- 50ml syringe
- Three candles
- Activities

NeuLog sensors required (not included):

- Pressure logger sensor
- Temperature logger sensor
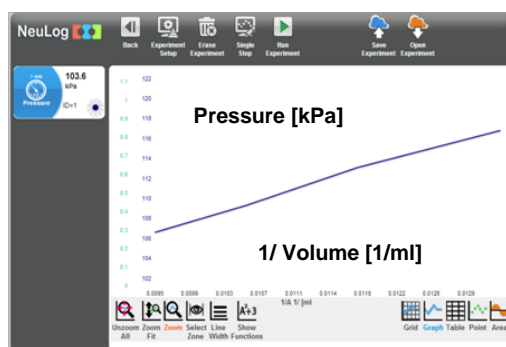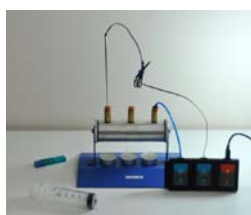
When measuring the gas pressure as a function of the total volume of the device (apparatus plus syringe) and plotting the pressure as a function of one over the volume we get this typical result.
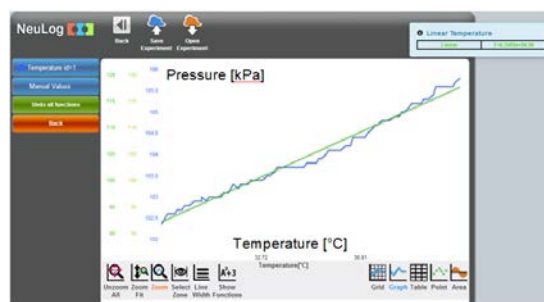
Graph of measured gas pressure as a function of gas temperature.

As seen here, this kit with the additional NeuLog logger sensors allows students to investigate gas properties in an easy but advanced way.

DST-KIT – Distillation Kit

Distillation is a method for separating mixtures based on their different boiling points. The separation is conducted by boiling and condensation. What happens to the temperature of a liquid during the boiling process? You might think that the temperature goes up smoothly, but this is not so. The graph of temperature against time is called a heating curve. In general, the longer the heating continues, the temperature goes up. However, there are horizontal flat parts on the graph which happen when there is a change of state. The plateaus are also called phase changes.
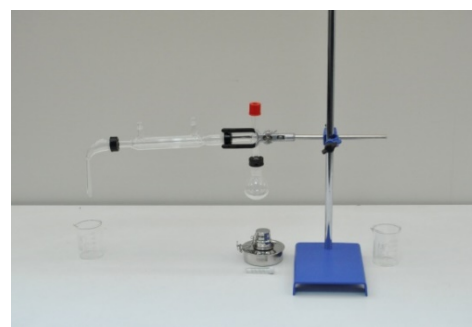

With this kit you will be able to investigate this fascinating behavior through measurements of both pure water and a mixture of water and alcohol or acetone.

This kit allows the study of:

- Heating curves
- Distillation
- Phase changes
- Latent heat

The kit consists of:

- Distillation head
- 25 ml round bottom flask
- Condenser
- Receiver
- Alcohol lamp
- Two 50 ml beakers
- Utility stand
- Right angle clamp
- Extension clamp
- Four boiling stones
- Activities
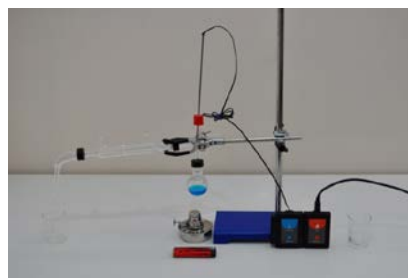
NeuLog sensors required (not included):

- Temperature logger sensor
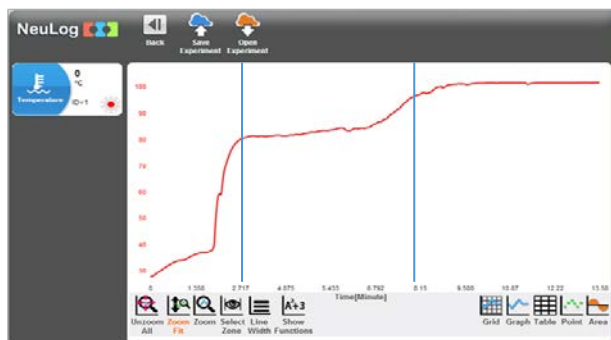
The graph shows the heating curve of a mixture of water and ethanol. It clearly shows the phase transition of the ethanol component at around 80°C (its boiling point is 78.5°C) and of water at around 100°C.

This kit allows students to visualize heating curves and to understand the concept of distillation.

CGG-KIT – Oxygen and Carbon Dioxide Kit

Combustion or burning is the sequence of exothermic chemical reactions between a fuel and an oxidant followed by the production of heat and conversion of chemical substances. The release of heat can produce light as glowing or a flame. Many organic compounds burn in the presence of oxygen (air contains approximately 21% oxygen) to produce water and carbon dioxide.

This kit together with an oxygen sensor allows students to investigate the oxygen concentration needed to sustain combustion. It enables the student to clarify the common concept that combustion ends when free oxygen concentration approaches zero and to prove that it is wrong.

Acid rain is a phenomenon associated with the development of urban and industrial areas. It consists of the incorporation of chemical compounds such as carbon dioxide, sulfur dioxide and nitrogen oxides. When these oxides are in contact with humidity in the atmosphere, they are transformed into their corresponding acids resulting in one of the most serious polluting causes. Using the Gas Generator, CO_2 is generated and brought in contact with water. The pH of the water changes and can be monitored using a pH logger sensor.

Photosynthesis is a process that occurs in the chloroplasts of plants and algae, and in some bacteria species. During this process solar energy is transformed into chemical energy that can be used by biological systems. The photosynthesis chamber is designed to contain plants or other organisms. It also has special holes for oxygen and CO_2 NeuLog sensors in order to measure oxygen and carbon dioxide changes of respiration and photosynthesis.
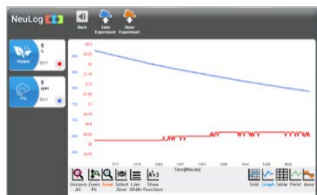
This kit allows the study of:
- Combustion
- Chemical kinetics
- Limiting reagent
- Acid rain
- CO_2 generation
- Dissolution of gases in water
- Carbonic acid
- Photosynthesis
- Respiration

The kit consists of:
- Gas generator
- Cover (glass)
- Candle base
- Candle
- Photosynthesis chamber
- CO_2 sensor opening stopper
- Oxygen sensor opening stopper
- Activities

NeuLog sensors required (not included):
- Oxygen logger sensor
- CO_2 logger sensor
- pH logger sensor

The graph shows the measurement of the oxygen logger sensor while inside the combustion environment. It can be seen that the initial free oxygen measurement is about 21% as it should be in the atmosphere; the concentration decreases to about 15% when the candle goes out. This result is far from the one expected by students.

The graph shows oxygen and carbon dioxide measurements during the photosynthesis process. In this process, oxygen increases while carbon dioxide decreases.

We can see that when the vinegar (which contains acetic acid CH_3COOH) is added to the baking soda (which is sodium bicarbonate $NaHCO_3$), CO_2 is produced and flows through the hose into the water. The pH decreases as the CO_2 is dissolved in the water exactly like the formation of acid rain.

SND-KIT – Sound Kit for Physics

Sound is a mechanical vibration that travels through matter as a waveform. It is transmitted as compression or transverse waves. A sound wave like other types of waveform has wavelength, frequency, velocity and amplitude.

Sound waves are a very abstract concept. It is difficult for students to grasp the relation between generated sound and wave's propagation. With this kit, students measure sound waves generated by tuning forks and a recorder and also isolate sound using different materials.

The kit contains equipment to produce sound and measure it through a sound sensor.

This kit allows the study of:

- Sound level
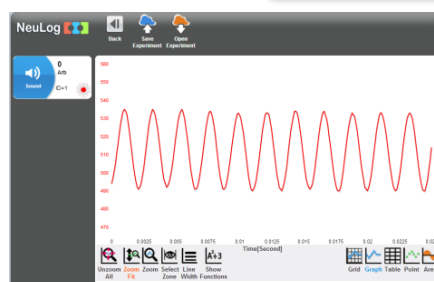- Sound waves
- Sound beats
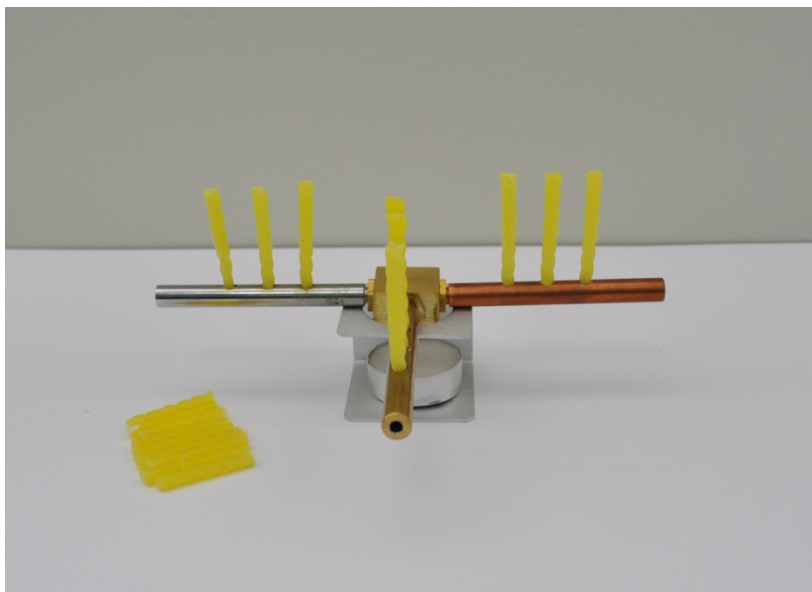- Sound isolation

The kit consists of:

- 426 Hz tuning fork
- 480 Hz tuning fork
- 512 Hz tuning fork
- Two resonance boxes (wooden boxes)
- Hammer
- Recorder (musical instrument)
- Sound isolation sponge
- Felt
- Ten paper towels
- Sound isolation box
- Egg tray
- Cellotape
- Activities

NeuLog sensors required (not included):

- Sound logger sensor

THR-KIT – Heat Kit for Physics

Thermal conductivity, is a physical property, which measures the capacity for heat conduction, or the capacity of a substance of transfering the kinetic movement of its molecules to its own adjacent molecules or to other substances with which it is in contact. Depending on the composition of the atoms of a material, the heat may move very slowly, or very quickly. This dependence is quantified by the coefficient of thermal conductivity. For example, thermal conductivity is higher in metals and is lower in gases.

In this kit, a qualitative and a quantitative study of the thermal conductivity of different solids such as copper, brass and steel, is conducted.

The kit contains equipment to produce heat and measure it through a temperature sensor.

This kit allows the study of:

- Thermal conductivity of solids
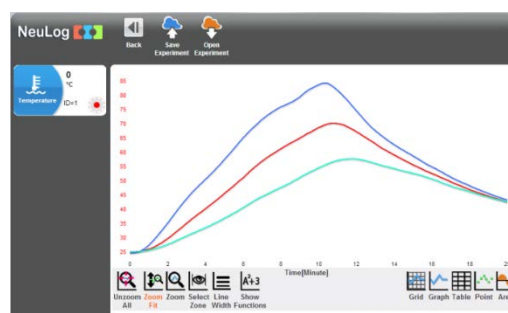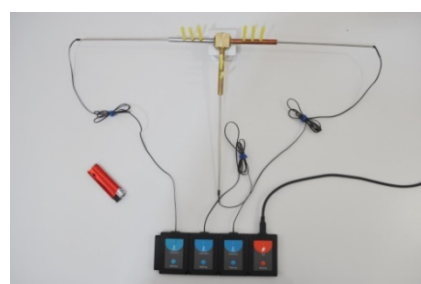- Qualitative studies and quantitative studies

The kit consists of:

- Thermal conductor (with three metal bars: copper, brass and steel)
- Candle
- Eighteen small candles for qualitative measurements
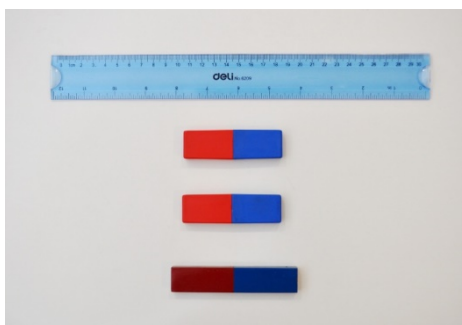- Candle holder
- Activities

NeuLog sensors required (not included):

- Three temperature logger sensors

This graph demonstrates how different metals conduct heat differently.

A bar magnet has two ends, known as the magnetic poles. One pole is called the north pole of the magnet and the other pole is called the south pole of the magnet. Opposite magnet poles attract each other and identical poles of magnets repel each other. Magnets also attract other materials which are not normally magnetic (various sorts of metals). They create a magnetic field in the space around them. A compass needle is a magnet and it will always point to the geographic north (unless it is interrupted by another magnet), lining up with the magnetic field of the earth. The magnet's field strength varies inversely as the square of the distance from it.

This kit allows students to compare, in a very simple way, the magnetic field of two different magnets. Also, the dependence of the intensity of the magnetic field on the distance is easily experienced.

This kit allows the study of:
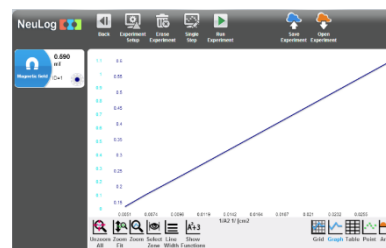
- Properties of magnets
- Magnetic field versus distance

The kit consists of:

- Alnico bar magnet
- Two magnets in plastic cases
- Ruler
- Activities

NeuLog sensors required (not included):

- Magnetic logger sensors

The graph shows the linear dependence of the magnetic field as a function of $1/(distance)^2$. A different slope will be produced with each magnet.

SES Training LABs

The training labs are based on learning-by-doing, which makes the students learn more quickly and remember what they have studied by performing practical experiments. They provide the students high profession skills and the knowledge on how to improve their chance of employment and earning capacity.

The manuals and courseware that accompany each course provide the theory background and experiments.

Electronics Training Lab
This modular laboratory is aimed for the **Electronics** profession, but also for technology disciplines that are also based in electronics, such as: **Electricity, Mechanics, Automotive, Robotics, Automation, Process control**.

Autotronics Training Lab
This modular laboratory is aimed for the five stages that comprise the automotive program: **Basic and automotive electronics, Car sub-systems simulators, Car sub-systems demonstrators, Car diagnostic and troubleshooting methods, Troubleshooting faults in a real car**.

Mechatronics Training Lab
This modular laboratory is aimed for the mechatronics program which includes the following disciplines: **Basic electronics, Pneumatics systems, Hydraulics systems, CNC machines**.

Refrigeration and Air-Conditioning Training Lab
The Refrigeration and Air-Conditioning training lab covers actual components and their interconnection, related functions, operation, diagnosis and repair methods through safe, hands-on practical activities.

Technology Preparation Training Lab
The Technology Preparation (Tech Prep) laboratory is a classroom-integrated laboratory consisting of educational modules covering a wide range of subjects such as: **Green energy, Computerized systems, Basic electronics, Basic communication, Mechanical systems.**

Science Training Labs
These laboratories (for primary, secondary and high schools) introduce the students to the computerized sensors world, **nature and industry processes** and **nature laws**. It will help them understand modern technologies such as: **home and medical appliances, wearing sensors, precise agriculture** and more.

Robotics Training Labs
The robotics programs (for primary, secondary and high schools) help students to build innovation and creativity skills. The idea is to make the students understand how systems work, to believe that they can improve them and be able to realize their ideas.

MultiCenter Training Lab
The MultiCenter offers a variety of selected interactive learning environments, with a large range of topics and activities such as: **Science, Technology, Graphic Design, Digital Music, Robotics, Computer Technologies** and much more for all sectors of society, cultures, different socio-economic groups and different age groups – from very young children to senior citizens.

SES

EDUCATION

Our Training Labs:

SCIENCE

ROBOTICS

ELECTRONICS

ELECTRICITY

TELECOMMUINCATION

AUTOTRONICS

MECHATRONICS

MULTICENTER

SCIENCE & ROBOTICS

TECHNOLOGY PREPARATION

REFRIGIRATION & AIR-CONDITIONING

SCIENCE