LEYBOLD®

NEW
ALSO WITH
WIFI

MOBILE-CASSY 2
WITH APPLICATION EXAMPLES

CASSY

THE ULTIMATE MEASURING DEVICE

FOR STUDENT AND LAB EXPERIMENTS IN NATURAL SCIENCES
FOR SCHOOLS AND UNIVERSITIES

LD DIDACTIC

MOBILE-CASSY 2

The only one measuring device you will need for measured values in physics, biology and chemistry at an attractive price

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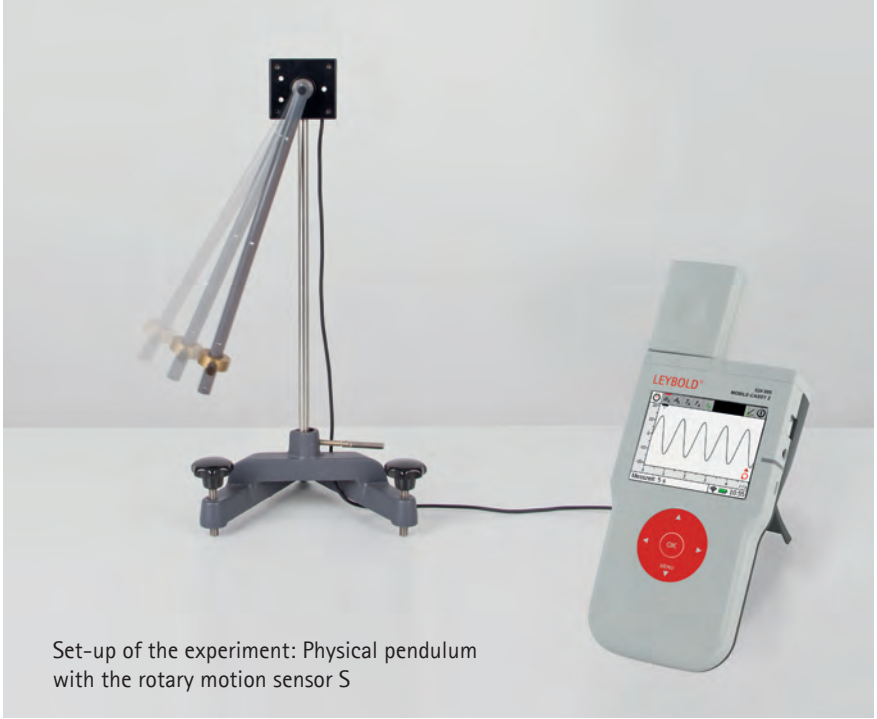


Set-up of the experiment: Physical pendulum with the rotary motion sensor S

MOBILE-CASSY 2

THE MEASURING DEVICE FOR STUDENT AND LAB EXPERIMENTS IN ALL NATURAL SCIENCES

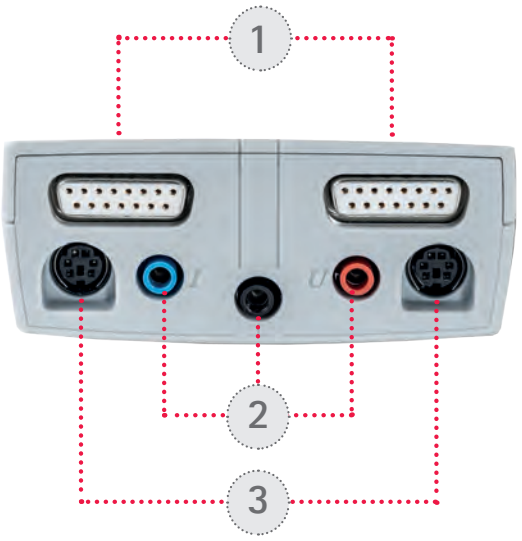
The latest generation of our Mobile-CASSY impresses through its

- universal connection possibilities,
- intuitive operation,
- fast recording of measured values,
- the graphical capability and
- optional WiFi.

MORE THAN ENOUGH REASONS FOR THE MOBILE-CASSY 2:

- Large measured value display.
- Automatic sensor recognition.
- Pre-integrated 4 mm safety sockets for the measurement of *U*, *I*, *P* and *E* in many measurement ranges.
- Inclusive of a NiCr-Ni temperature sensor.
- Compatible with all CASSY sensors S and M.
- The touch wheel – with a turn of the wheel quickly change to the appropriate screen or the appropriate list entry.
- Particularly suitable for student groups, as the screen is not hidden during operation.
- Measurement time, measurement interval, trigger and pre-trigger (advance) are adjustable.
- Graphs of measured values with freely selectable coordinate axes and selectable evaluation methods (e.g. zoom and straight line fitting).
- Measured values and screen shots can be saved on an integrated micro SD card and copied onto a USB stick.
- Full support from CASSY Lab 2, via USB lead for teaching by demonstration with the projector.
- Replaceable, high-quality rechargeable batteries ensure long battery life both during operation (8 hours) and also on standby (several years).
- Support leg allows easy viewing angle.
- Also available with WiFi.

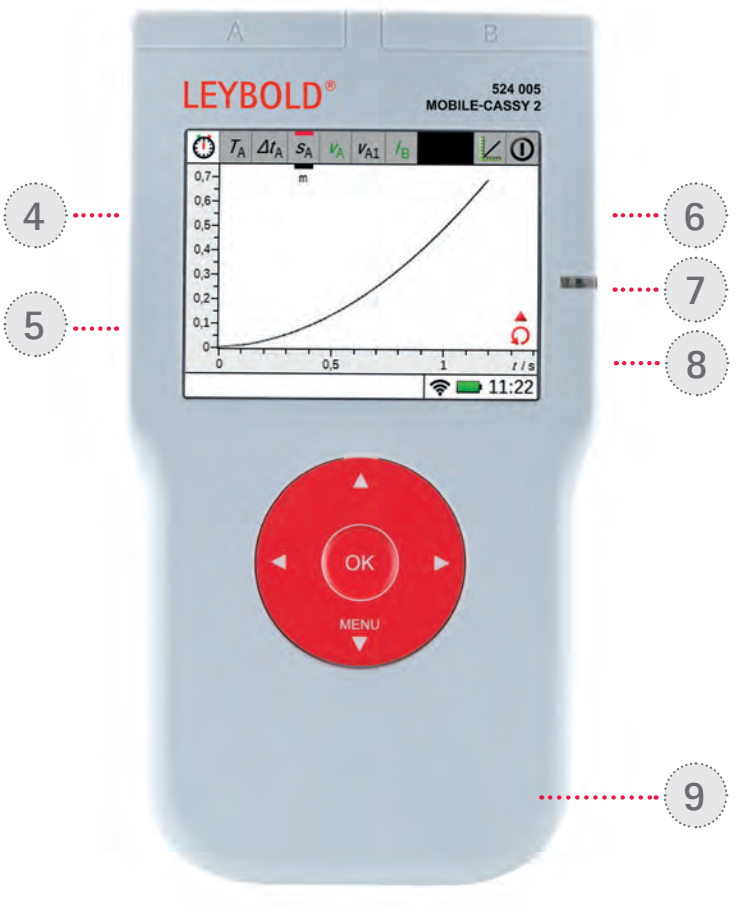
THE UNIVERSAL CONNECTION POSSIBILITIES



1 2 SENSORS S
all CASSY sensors S and sensor boxes are supported

2 VOLTAGE AND CURRENT
directly via 4 mm safety sockets

3 2 SENSORS M
e.g. for the light barriers in the Advanced Science Kit Set MEC 6



4 NiCr-Ni TEMPERATURE SENSOR (SUPPLIED)
via type K socket

5 USB STICK
for the simple transfer of measured data and screen shots

6 PC
via USB cable with full CASSY Lab 2 support

7 CHARGER (SUPPLIED)
with status display

8 KENSINGTON LOCK
as anti-theft protection

9 WIFI (OPTIONAL)
for wireless data transfer e.g. to a PC with CASSY Lab 2 or a tablet

WIFI

Simple, wireless networking to Whiteboards, Tablets & Apps

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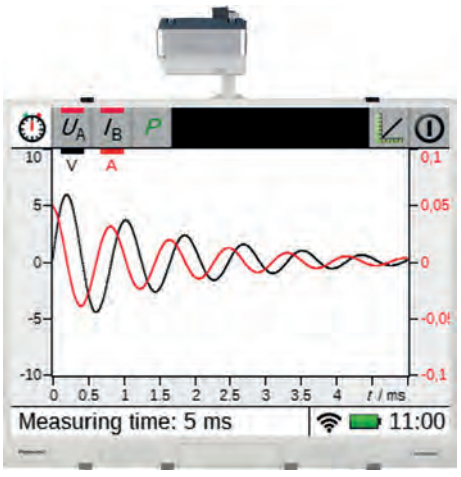
Mobile-CASSY 2 WiFi can be connected wirelessly in a WiFi network with a computer or tablet. Alternatively it can set up its own WiFi network (access point).

The wireless connections opens up additional possibilities for the demonstration of experiments:

- Wireless connection to a VNC client on a computer or tablet for remote control or displaying the Mobile-CASSY display; e.g. on an interactive whiteboard or a tablet.
- Wireless connection to CASSY Lab 2 under Windows/Linux.
- Wireless connection to one of our Apps (Multimeter, Oscilloscope or the CASSY App) on tablets or smart phones.



DEMONSTRATION VIA WHITEBOARD

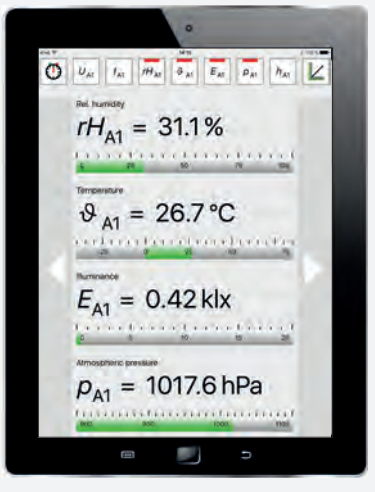
Mobile-CASSY 2 can connect to a VNC client (Virtual Network Computing) on an interactive whiteboard. By projecting the Mobile-CASSY 2 display demonstrative experiments for the entire class are enabled.

The Mobile-CASSY display and the whiteboard always show the same screen. The operating can be executed both on Mobile-CASSY 2 as well as on the whiteboard. VNC clients are available free of charge for all customary operating systems e.g. Windows/OS X/Linux/Android/iOS and easy to install.

APPS FOR INTERACTIVE EXPERIMENTS

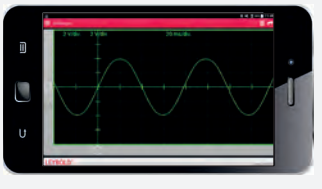
Practical experiences of the students while experimenting are supported by our apps. Both, the access with an analogue multimeter and dual-channel oscilloscope (both running under Android) can be downloaded as an app in the Google Play Store.

The comprehensive CASSY app (Android/iOS/Windows) for the platform-independent use in the classroom also offers many possibilities for various measurements as well as the storage for further use of the obtained measurement data.



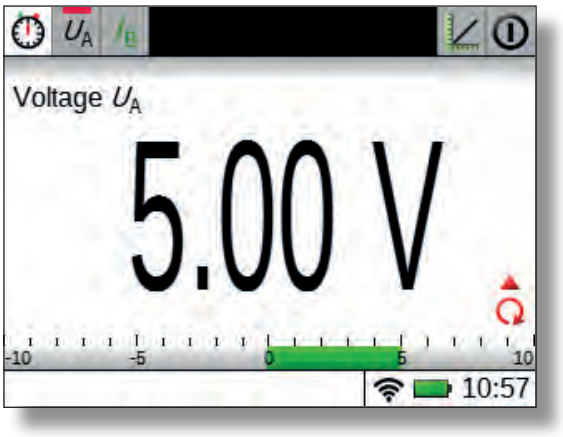
CASSY APP on a tablet

MULTIMETER APP
on a mobile phone



OSZILLOSKOP APP
on a mobile phone

TECHNICAL DATA AT A GLANCE



HIGH-CONTRAST DISPLAY SHOWN AT ORIGINAL SIZE AND RESOLUTION

From the display icons, above the measured value, the measurement channels are shown and can be selected.

Whilst the icons below on the right are accessing the set-up menues ▲ and other displays through the touch wheel ↻.

Graphic display:	9 cm (3.5"), colour QVGA
Operation:	large capacitive touch wheel (42 mm)
Resolution:	12 Bit
Integrated measurement ranges Voltage:	±0.1/±0.3/±1/±3/±10/±30 V
Integrated measurement ranges Current:	±0.03/±0.1/±0.3/±1/±3 A
Integrated measurement ranges Temperature:	-200 ... +200 °C / -200 ... +1200 °C
Sensor connections:	2 (CASSY sensors S and sensors M)
Sampling rate:	maximum 100,000 values/second
Time resolution of the timer inputs:	20 ns
Loudspeaker:	integrated for key tones and GM counter tube (can be disabled as required)
Data storage:	integrated micro SD card for more than a thousand measurement files and screen shots, optionally also via a USB stick
Accumulator capacity:	14 watt-hours (AA size, replaceable)
WiFi (optional):	802.11 b/g/n as access point or client (WEP/WPA/WPA2)
VNC server:	integrated (with WiFi)

MOBILE-CASSY 2 / MOBILE-CASSY 2 WIFI

Cat. No.	Description
524 005	Mobile-CASSY 2
524 005W*	Mobile-CASSY 2 WiFi
524 0034*	Charging adapter for Mobile-CASSY

* Available from July 2016

Scope of delivery:

- Mobile-CASSY 2
- Battery charger
- NiCr-Ni temperature sensor
- Quick guide

SENSORS M

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Alongside the numerous CASSY sensors S, the sensors M are the perfect supplement for LEYBOLD students experiments with Mobile-CASSY 2.

- Currently 6 different sensors
- Particularly suitable for students experiments
- Selected measurement ranges
- Connection via the supplied Mini DIN cable

LIGHT BARRIER M (524 431)

Cascadable photoelectric barrier for measuring period durations, travelling time, paths and velocities on the student track or during free fall with Mobile-CASSY 2.

- Time resolution: 100 ns
- Path resolution: 5 mm when utilising the spoked wheels
- Cascading: up to 5 photoelectric barriers (e.g. for travelling time measuring or up to 5 sequential relocity measurements on one track)
- Fixing: locking in place under the student track or via M6 threads

Cat. No.	Description
524 431	Light barrier M

Additionally recommended

Cat. No.	Description
554 4322	Spoked wheel
524 4323	Start jig, trolley
524 4324	Start jig, ball

FORCE SENSOR M, ±50 N (524 434)

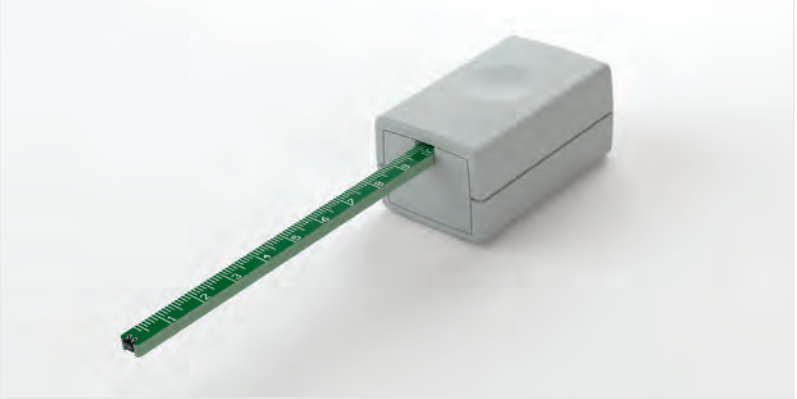
For measuring force components up to ±50 N (e.g. spring pendulum or centrifugal force components) with Mobile-CASSY 2. Its rigid design enables the measurement of force components in any position of the force sensor.

- Measurement ranges: ±5/±50 N
- Resolution: 0.1 % of the measurement range
- Compensation (Tare): ±50 N in every measurement range
- Fixing: with securing bolts on stand equipment

Cat. No.	Description
524 434	Force sensor M, ±50 N

Available from August 2016

SENSORS M



MAGNETIC FIELD SENSOR M, ±100 mT (524 436)

For measuring the tangential or axial magnetic flux density up to ±100 mT with Mobile-CASSY 2.

- Measurement ranges: ±10/±100 mT
- Resolution: 0.05 % of the measurement range
- Measurement direction: switchable between axial and tangential

Cat. No.	Description
524 436	Magnetic field sensor M, ±100 mT

Available from August 2016

VOLTAGE SENSOR M, ±30 V (524 438)

For measuring the electrical voltage up to ±30 V with Mobile-CASSY 2. In connection with the integrated voltage input, Mobile-CASSY 2 can become a 2 channel storage oscilloscope.

- Voltage input: 4 mm safety sockets
- Measurement ranges: ±3/±30 V
- Resolution: 0.05 % of the measurement range
- Sampling rate: maximum 100,000 values/s

Cat. No.	Description
524 438	Voltage sensor M, ±30 V

Available from August 2016

GM ADAPTER M (524 440)

For measuring radioactive radiation with a Geiger-Müller counter tube (559 01 or 559 012) with Mobile-CASSY 2.

- Counter tube voltage: 500 V (internally generated)
- Counter tube input: Coaxial socket

Cat. No.	Description
524 440	GM adapter M

Available from August 2016

MICROPHONE M (524 442)

For measuring noise level, frequency and the microphone voltage of acoustic signals with Mobile-CASSY 2.

- Frequency range: 50 ... 20,000 Hz
- Measuring variables: Voltage, frequency, noise levels
- Measurement ranges: automatic
- Sampling rate: maximum 100,000 values/s

Cat. No.	Description
524 442	Microphone M

Available from August 2016

STUDENT EXPERIMENTS PHYSICS

Application examples

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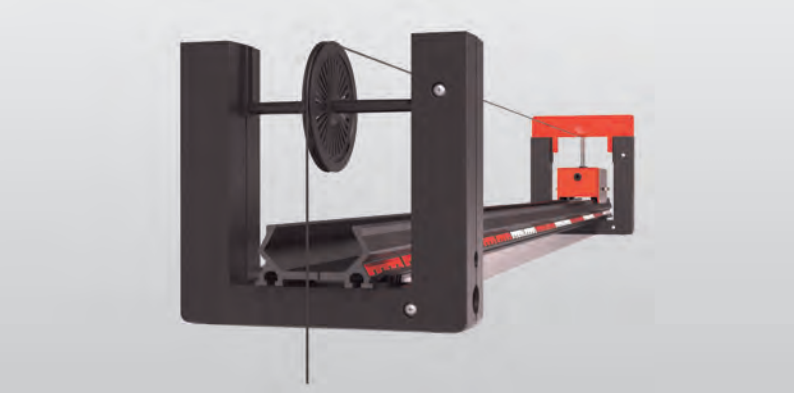


MECHANICS

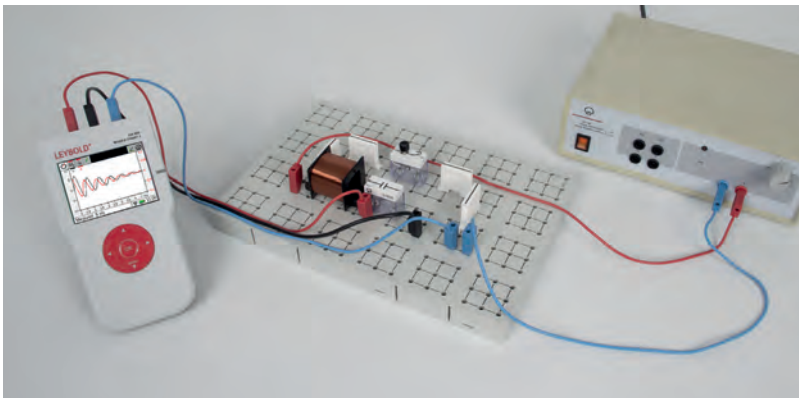
UNIFORMLY ACCELERATED MOTION ON A TRACK

Already during movement, Mobile-CASSY 2 can graphically represent the $s(t)$ diagram and the $v(t)$ diagram, using the light barrier M and a spoked wheel. Its parabola and straight line fit can determine the acceleration without a computer.

ACOUSTICS

EXPERIMENTS WITH A TUNING FORK

With Mobile-CASSY 2 and the microphone M it is possible to measure the sound level in dBA and the frequency in Hz. Furthermore, the signal of the microphone can be displayed as a $U(t)$ diagram.



ELECTRICITY

CHARGING AND DISCHARGING A CAPACITOR

The short time period for charging and discharging a capacitor will be displayed by utilising the 4 mm sockets on Mobile-CASSY 2. Hereby, not only $U(t)$ and $I(t)$ will be measured but also $P(t)$ and $E(t)$ when desired. The student can therefore e.g. easily determine the time constant $\tau = RC$ or the capacity $C = \frac{2E}{U^2}$.

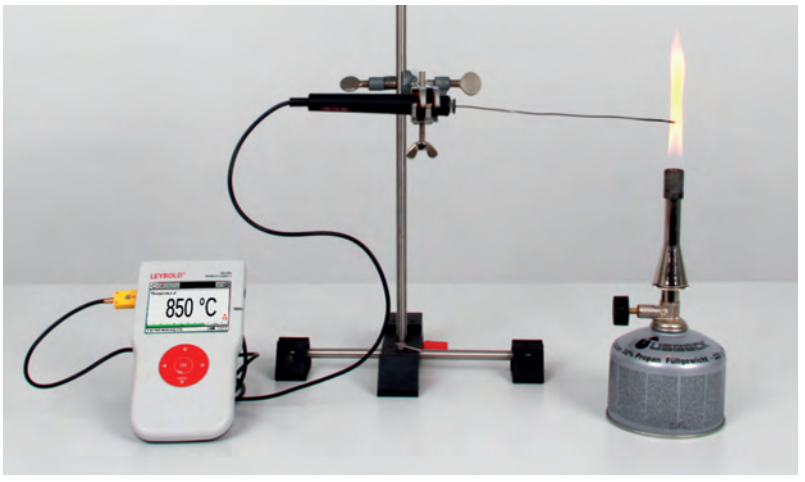
(ENVIRONMENTAL) RADIOACTIVITY

DEFLECTION IN A MAGNETIC FIELD

A magnetic field in front of the button-shaped source alters the radiation direction of the β-particles. With Mobile-CASSY 2 and the GM adapter M, it is possible to count the impulses and therefore give a conclusion about the direction in which the particles will be deflected.

STUDENT EXPERIMENTS
CHEMISTRY

Application examples



GENERAL CHEMISTRY

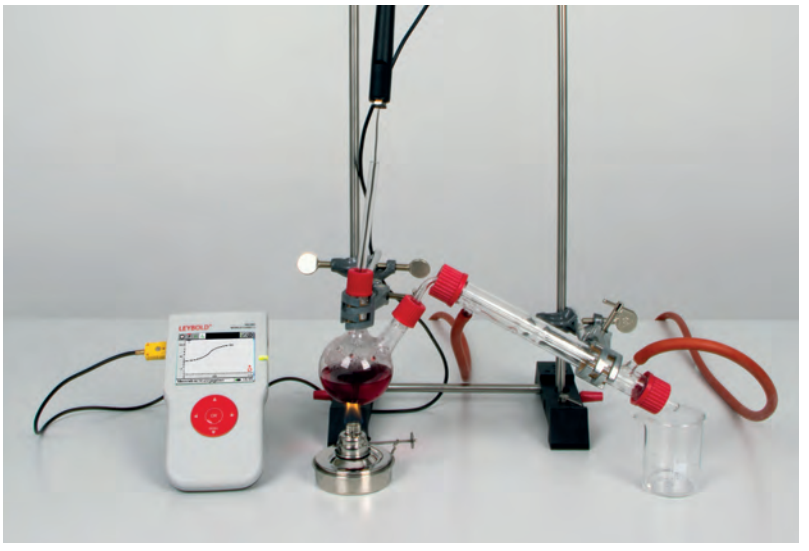
THE BUNSEN BURNER

In this beginner's lesson the hottest point in the Bunsen burner flame is to be determined. The temperature is measured at various locations in the glowing flame of the Bunsen burner. For this experiment, students use the integrated socket for the temperature sensor in Mobile-CASSY 2.

ORGANIC CHEMISTRY

DISTILLATION OF RED WINE

As an example of material seperation, the process of distillation will be represented in this experiment. The temperature on the vapour of red wine and distilled ethanol will be measured. Mobile-CASSY 2 with the integrated socket for the temperature sensor is utilised for the measuring.



INORGANIC CHEMISTRY

RECORDING A TITRATION CURVE

One very important experiment in the field of acids and bases ist he titration process. Hydrochloric acid will be titrated with sodium hydroxide to be able to measure how much hydrochloric acid was in the solution. The pH electrode with the pH adapter will be utilised in this experiment.

STUDENT EXPERIMENTS BIOLOGY

Application examples

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ECOLOGY / ENVIRONMENTAL ANALYSIS

TURBIDITY MEASUREMENT FROM WATERS

Turbidity is an important parameter to evaluate water quality. The turbidity can be easily measured on-site with Mobile CASSY 2 in combination with the Immersion photometer S.

BIOLOGY FOR HUMANS

NEUROBIOLOGY

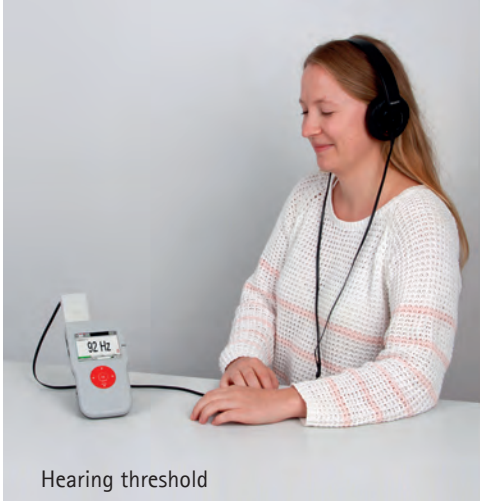
The reaction time will be determined. Therefore the following questions must be clarified: Does our reaction time increase when we are distracted? How fast is the conductivity time of our nerves? The Hand and Foot switches with Reaction test adapter S connected with Mobile-CASSY 2 will provide the answers.

HUMAN PHYSIOLOGY

What influence does excitement have on our skin resistance? Does our blood pressure varies at rest and while in motion? These and other human biological analysis can be measured with various adapters S and also with the Mobile-CASSY 2 while on the move.

Reaction time

Blood pressure



Hearing threshold

Skin resistance

STUDENT EXPERIMENTS
BIOLOGY

Application examples

Backpack for environmental analysis with Mobile-CASSY 2 and various sensors

ENVIRONMENTAL ANALYSIS

BACKPACK FOR ENVIRONMENTAL ANALYSIS

The backpack for environmental analysis contains the Mobile-CASSY 2 and sensors for ecological measurements. All devices are clearly arranged. The high wearing comfort allows for analysis even in remote areas.

The measured data can be read directly on the Mobile-CASSY 2 and recorded for later analysis.

The various sensors enable the acquisition of relative humidity, air and soil temperature, illuminance, air pressure and height. Furthermore pH, conductivity, water temperature and turbidity can be measured.

SCOPE OF DELIVERY

524 005	Mobile-CASSY 2 incl. power supply and NiCr-Ni temperature sensor
524 0573	Climate sensor S
524 069	Immersion photometer S
524 0671	Conductivity adapter S
529 670	Conductivity sensor
524 0672	pH adapter S
667 4172	pH sensor
661 231	2 x Polyethylene bottle, 100 ml
	Backpack

Cat. No.	Description	
666 391	Backpack for environmental analysis	

CHARACTERISTICS

- high flexibility for experiments outside
- unrestricted movement

Possible Analysis:

- Temperature influence on organisms
- Humidity in different ecological niches
- Physical and chemical properties of various types of soil
- Pollution of inland waters (photometric reagent set required)
- Influence of light on plants
- Turbidity of waters
- Determination of the conductivity, the pH value and the temperature of surface waters

PHYSICS
CHEMISTRY
BIOLOGY
ENGINEERING

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120 0703EN 03.2016 LD
Technical details subject to change without notice

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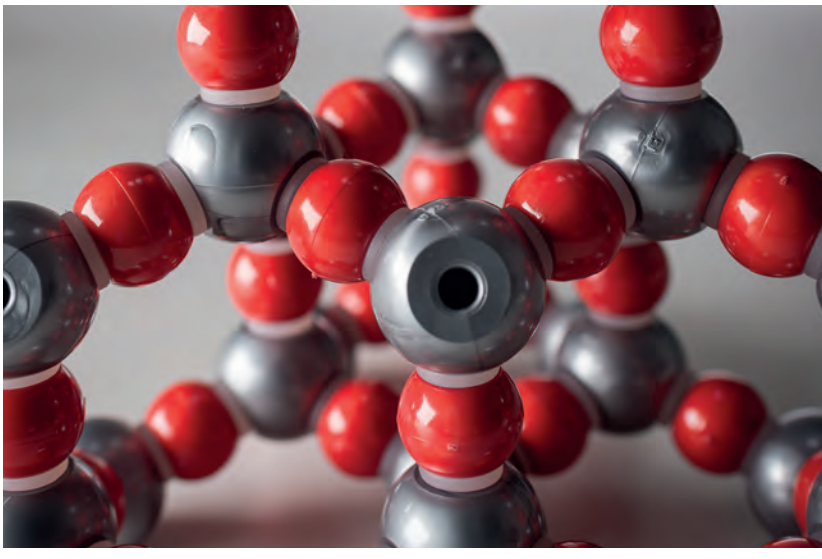

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