



### Digital science education

The complete solution by PHYWE









### Digital science education

## The complete solution by PHYWE

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This is how digital teaching works today

Whether classroom teaching, homeschooling or teaching in nature – the way of teaching has changed. Digitalization has reached us in all areas of life, and this also applies to our schools. Many programs were initiated so that school lessons can be designed in a contemporary way. Funding is not enough, however – you need practical solutions for teaching science.

At PHYWE, we have developed a concept for digital teaching that consists of four components:



**Experiment sets** 



Sensors



Display unit



**Software** 

With this well thought out solution that relates directly to your curriculum, you can design your school lesson simple, progressive and time-saving. Be state-of-the-art: Work with modern, high-performance hardware, supported by our specially developed software and combine this individually with our digital sensors and the tried and tested TESS sets.

Get to know our digital product portfolio now.



Digital science education in the classroom

Simple. Direct. Experiment.

Face-to-face teaching rethought through the use of experiment sets that conform to the curriculum, state-of-the-art sensors, powerful display units, the most advanced measurement software and excellent teaching and learning platform.



#### Cobra SMARTlink







Simple. Digital. Experiment.



Cobra SMARTlink is a state-of-the-art, high-performance 3-in-1 tablet: Measuring device, display unit and Android-tablet for your digital science education. Especially good, easy and reliable to use in student experiments.

Further info on page 8



Item no: 12999-99



measureAPP **i**OS **i**OS **i**OS









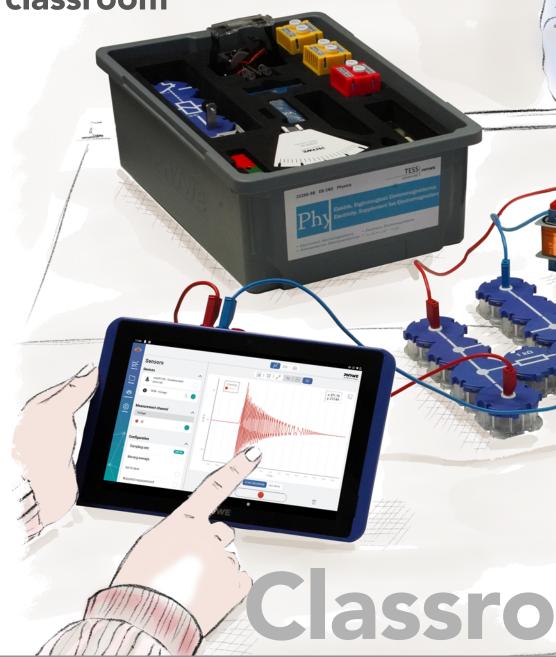
Simple. Mobile. Measurement.



measureAPP is the mobile app for quick and easy datalogging of measured values in your digital science education.

Further info on page 18

Item no: 14581-61







### 



Simple. Digital. Teaching.



curricuLAB® is the award-winning teaching and learning platform for a quick and uncomplicated access to digital science education.

Further info on page 16

Item no: 14577-62



### Cobra SMARTsense 🕴 🗠





Simple. Intuitive. Measurement.



With the Cobra SMARTsense sensors, PHYWE offers the ideal solution for the inexpensive implementation of digitization of school lessons.

Further info on page 10



#### **Experiment sets for students (TESS)**

Simple. Complete. Experiment.



With TESS, PHYWE offers a simple, safe and time-saving solution for student experiments in digital science.

Further info on page 20

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### Digital science education at home

Simple. Networking. Experiment.

Homeschooling means digital teaching outside of school. In order for you to make this just as efficient and successful as your classroom teaching, you need an excellent teaching and learning platform, easy-to-use sensors, a powerful display unit and advanced measurement software.



### Cobra SMARTlink 🖷 🕴 🖛 🤶







Simple. Digital. Experiment.



The 3-in-1 Cobra SMARTlink tablet is the ideal display unit for digital content in the context of homeschooling. Thanks to the large number of integrated sensors, it is also perfect for experimenting at home.

Further info on page 8

Item no: 12999-99



measureAPP # iOS # 🖵 🗀









Simple. Mobile. Measurement.



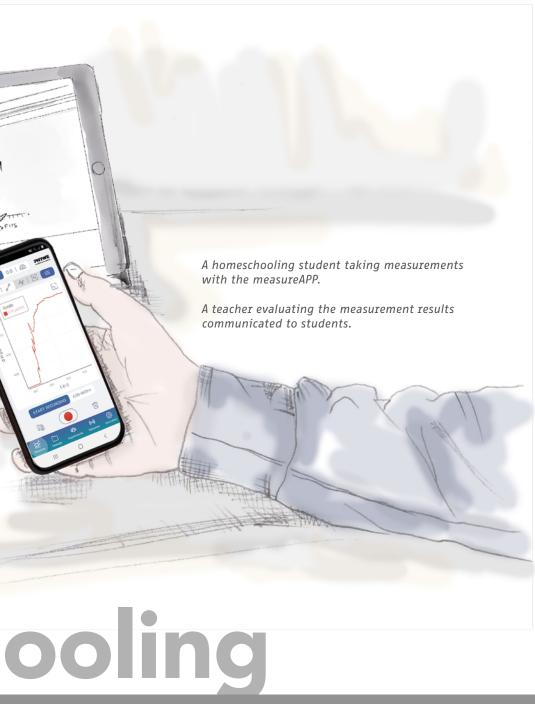
The measuring software measureAPP, which is available for all platforms and devices, is the ideal accompaniment for your students in homeschooling.

Further info on page 18

Item no: 14581-61



Homesch





#### curricuLAB® 🖵 🔲



Simple. Digital. Teaching.



The excellent teaching and learning platform curricuLAB® is perfectly suited for providing your digital learning content and experimental literature in homeschooling.

Further info on page 16

Item no: 14577-62



### measureLAB ## macOS \_\_\_\_





Simple. Precise. Measurement.



The measurement software measureLAB supports you with very fast measurement recordings and with the detailed evaluation of your own measurement results and those of the students.

Further info on page 19

Item no: 14580-61



#### **Experiment sets for teachers (DEMO)**

Simple. Complete. Demonstrate.



Our experiment sets for teachers are perfect for demonstration experiments in the context of homeschooling.

Further info on page 22

www.phywe.de Page 5 Digital science education in nature

Simple. Mobile. Experiment.

Mobile teaching in the environment and in the field is very important, but it poses a number of challenges. Be perfectly prepared with specially coordinated experiment sets, mobile and durable measuring devices and display units, robust sensors and advanced measuring software.



#### Cobra SMARTlink







Simple. Digital. Experiment.



With its long-lasting battery, the large and bright display and the already integrated sensors, the 3-in-1 Tablet Cobra SMARTlink is perfect for experimenting in nature.

Further info on page 8



Item no: 12999-99



measureAPP ios ios ios ios











Simple. Mobile. Measurement.



The mobile measuring software measureAPP is the ideal companion for the simple and fast acquisition of measured values, also in the environment and in the field.

Further info on page 18









### curricuLAB® 🖵 🗀



Simple. Digital. Teaching.



The curricuLAB® teaching and learning platform is perfect for the provision of your digital learning content and descriptions of experiments in nature.

Further info on page 16





### Cobra SMARTsense ★ ←





Simple. Intuitive. Measurement.



Our mobile Cobra SMARTsense sensors are ideal for teaching in nature.

Further info on page 10



#### **Experiment sets for students (TESS)**

Simple. Complete. Experiment.



Our experiment sets for students, specially designed for use in nature, include everything you need outside of the classroom.

Further info on page 20

www.phywe.de



### Cobra SMARTlink • ★ ★ 🤝



Cobra **SMARTlink** 

Simple. Digital. Experiment.

#### Cobra SMARTlink is a state-of-the-art, high-performance 3-in 1 tablet:

- Measuring device: Start measuring directly with 7 integrated sensors and the pre-installed measurement software measureAPP, 4 USB-Ports for connection of additional sensors, microphone and GPS-sensor
- Display unit: A brilliant 10.1 "display offers sufficient space for all applications
- Android tablet: Access to more than 3 million apps in the Google Play Store

**Especially recommended for student experiments** as it can be used simple, good and reliably.

exactly what you want."





- Acceleration
- Light
- Voltage

- Temperature (2x)
- UV
- Humidity

Current

# Enough power for all your applications.



A powerful 8-core processor with a clock rate of 2 GHz, 4 GB of RAM and a 64 GB SSD hard drive ensure that everything always runs smoothly.

### In case you need a little more.



More than 40 Cobra SMARTsense sensors can be connected via Bluetooth and USB.

# On your marks, get set, go!



The pre-installed measureAPP offers more than 150 experimental descriptions for all subjects.

# Perfect for experimenting, but not only.



S

There are more than 3 million apps from the Google Play Store ready for use.

## Everything in perfect view.



The brilliant 10.1 "full HD display offers sufficient space and a razor-sharp display.

### Battery for the whole day ... and more.



The large battery with 10.000 mAh ensures use throughout the (school) day.

## Evyerthing you need in perfect storage.



The accessories for the Cobra SMART-link include 2 connection cables 4 mm (red, blue), 2 temperature sensors type K, a USB type C charging cable with charging adapter and an easily understandable manual. The sturdy packaging cardboard including storage box enables a quick check for completeness.

Cobra SMARTlink <u>Item no: 12999-99</u>

Cobra SMARTlink - SMARTlink version for non-eu countries Item no: 12999-99E

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**8** 

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### Cobra SMARTsense → ←

# Cobra SMARTsense

# Simple. Intuitive. Measurement.

Cobra SMART	sense Sensors	for Physics											
Sensor	Voltage	Current	Force & Acceleration	Temperature	Dual Photogate	Pressure	Acceleration	Motion	3-Axis Magnetic field	Light	Radioactivity	Surface Temperature	High Current
Image	Value Province ( ) O ( )		***	*	*	*	PHOTONE ( O CO	RITWE 1 **	*	PHYWE CO.	***	PHYME 100	PATTER   O_A
Measured value	Voltage	Current	Acceleration	Temperature	Time	Pressure	Acceleration	Distance	Magnetic flux	Brightness	Radioactivity	Surface Temperature	Current
Measurement range	± 30 V *	± 1 A *	± 50 N / ± 16 g	- 40120 °C	0 ∞ s	20400 kPa	± 8 g	0,202 m	130 mT / 5 mT	1128 klx	040000 c/min	- 25125 °C	±10 A *
Resolution	0,02 V	0,5 mA	30 mN	0,01 °C	0,01 ms	0,1 kPa	0,01 g	1 mm	0,1 mT / 0,001 mT	1 lx	1 c/min	0,1 °C	10 mA
Sampling rate	1 kHz / 10 kHz	1 kHz / 10 kHz	1000 Hz	10 Hz	1000 Hz	500 Hz	100 Hz	50 Hz	20 Hz	10 Hz	100 Hz	10 Hz	1000 Hz
Battery	Li-ion battery	Li-ion battery	Li-ion battery	CR2032	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery				
Item number	12901-01	12902-01	12943-00	12903-00	12945-00	12905-01	12907-01	12908-01	12947-00	12906-01	12937-01	12917-01	12925-00

Cobra SMARTs	ense Sensors f	or Physics			
Sensor	Rotary Motion	Energy	Sound	Wide Range Temperature	Photogate
Image	*	A CONTRACTOR OF THE PARTY OF TH	POTIVE S OF	*	*
Measured value	Angle	Current, Voltage Work	Sound level	Temperature	Time
Measurement range	30 rps	± 30 V / ± 1 A	0,115 kHz /55110dB	- 20330 °C	0 ∞ s
Resolution	0,125°	1mV; 40 μA	0,1 dB	C = 0,01°C	0,01 ms
Sampling rate	100 Hz	100 Hz	10 Hz (Soundlevel); 32kHz (Soundsignal) at USB	10 Hz	1000 Hz
Battery	Li-ion battery	Li-ion battery	Li-ion battery	CR2032	Li-ion battery
Item number	12918-00	12919-00	12939-00	12910-00	12909-00

Cobra SMAR	Tsense Sensor	s for Science				
Voltage	Current	Temperature	Force & Acceleration	Light	CO <sub>2</sub>	Humidity
Petroit ( )	A CONTRACTOR OF THE CONTRACTOR	*	*	*	*	*
Voltage	Current	Temperature	Acceleration	Brightness	CO <sub>2-</sub> Concentration	Humidity
± 30 V *	± 1 A *	- 40120 °C	± 50 N / ± 16 g	1128 klx	0100.000ppm	0100 % rH
0,02 V	0,5 mA	0,01 °C	30 mN	1 lx	2 ppm	0,1 % rH
1 kHz / 10 kHz	1 kHz / 10 kHz	10 Hz	1000 Hz	10 Hz	1 Hz	10 Hz
Li-ion battery	Li-ion battery	CR2032	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery
12901-01	12902-01	12903-00	12943-00	12906-01	12932-01	12931-01

<sup>\*</sup> Overvoltage protection



Cobra SMAF	RTsense Senso	rs for Chemist	ry										
Sensor	рН	Conductivity	Dropcounter	Colorimeter	Thermocouple	Nitrate Ion	Ammonium Ion	Chloride Ion	Calcium Ion	Potassium Ion	Oxygen Reduction Potential (ORP)	Temperature	Methane
Image	*	*	*	* ·	*	*	PPETRICE 4 Dec	PRIVATE (S)	PITTURE 1 0-1	*	*	*	*
Measured value	рН	Conductivity	Drop count	Transmission	Temperature	Nitrat- Concentration	Ammoniom- Concentration	Chloride- Concentration	Calcium- Concentration	Potassium- Concentration	Redoxpotential	Temperature	Methane- Concentration
Measurement range	014 pH	020.000 μS/cm 0100 °C	0∞ Imp	0100 %, 03 abs, 0400 NTU	-2001.200 °C	0,66200 ppm	0,91800 ppm	1,83550 ppm	0,44000 ppm	0,43900 ppm	-20002000 mV	- 40120 °C	010000 ppm
Resolution	0,01 pH	8 μS/cm, 0,1 °C	30 Imp/s	0,1%, 0,01 abs	0,1 °C	2 ppm	0,5 ppm	1 ppm	1 ppm	1 ppm	1 mV	0,01 °C	3 ppm
Sampling rate	100 Hz	10 Hz	50 Hz	1 Hz	10 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	10 Hz	100 Hz
Battery	CR2032	CR2032	Li-ion battery	Li-ion battery	Li-ion battery	CR2032	CR2032	CR2032	CR2032	CR2032	CR2032	CR2032	Li-ion battery
Item number	12921-00	12922-00	12923-00	12924-01	12938-01	12912-00	12913-00	12914-00	12915-00	12916-00	12927-00	12903-00	12949-00

Cobra SMAR	Tsense Sensors	for Biology											
Sensor	Humidity	EKG	CO <sub>2</sub>	Spirometer	Heart rate	0xygene	Blood pressure	Skin resistance	Ethanol vapor	Weather station	рН	Conductivity	Methane
Image	*	*	*	*	*	*	*	DHYWE 10 m	*	*	*	*	*
Measured value	Humidity	Voltage	CO <sub>2</sub> -Concentration	Volume flow	Heare rate	CO <sub>2</sub> -Concentration	Blood pressure	Skin resistance	Ethanol- Concentration	Pressure, Humidity, Temperature	рН	Conductivity	Methane- Concentration
Measurement range	0100 % rH	04,5 mV	0100.000ppm	± 10 l/s	30200 bpm	020 mg/l 0100 %	30200 bpm	010 μS	03 %	010 μS	014 pH	020.000 μS/cm 0100 °C	010000 ppm
Resolution	0,1 % rH	4,5 μV	2 ppm	0,01 l/s	1 bpm	0,01 mg/l, 0,1 %	1 bpm	0,01 μS		0,01 μS	0,01 pH	8 μS/cm, 0,1 °C	3 ppm
Sampling rate	10 Hz	1000 Hz	1 Hz	200 Hz	10 Hz	100 Hz	10 Hz	100 Hz	100 Hz	0,01 μS	100 Hz	10 Hz	100 Hz
Battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	Li-ion battery	CR2032	CR2032	Li-ion battery
Item number	12931-01	12934-01	12932-01	12936-01	12935-01	12933-01	12944-00	12942-00	12948-00	12946-00	12921-00	12922-00	12949-00

\* Overvoltage protection

USB quick charger with 6 USB ports

Button cell CR2032, 3V (2 pcs)

Item number: 07922-17

measureAPP

Item number: 14581-61 for free

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Accessories:



### SensorCases for Cobra SMARTsense

Simple. Perfect. Storage.

The SensorCases Cobra SMARTsense are the smart solution for comfortable and mobile storage. The sturdy sensor cases with 16-fold automatic charger, robust wheels and pull-out bare telescopic handle contain all equipment in a box with up to 56 Cobra SMARTsense sensors in stable foams.













SensorCase Cobra SMARTlink, 8-fold

SensorCase Cobra SMARTlink, 16-fold

Item number: 12986-88

Item number: 12987-88 1 unit

# SensorCase Cobra SMARTsense







Item number: 12901-01	16 unit
Item number: 12902-01	16 unit
Item number: 12903-00	16 unit
Item number: 12943-00	8 unit
Item number: 12980-00	1 unit
Item number: 12981-88	Set
	Item number: 12902-01 Item number: 12903-00 Item number: 12943-00 Item number: 12980-00







Cobra SMARTsense – Temperature, -40 120 °C	Item number: 12903-00	16 units
Cobra SMARTsense – Thermocouple, -200 +1200 °C (Bluetooth + USB)	Item number: 12938-01	16 units
Cobra SMARTsense – pH, 0 14 (Bluetooth)	Item number: 12921-00	16 units
Cobra SMARTsense – Dropcounter, 0 ∞	Item number: 12923-00	1 units
SensorCase for Cobra SMARTsense	Item number: 12980-00	1 units
SensorCase Cobra SMARTsense, Chemistry, 16-fold	Item number: 12982-88	Set







Cobra SMARTsense – Temperature, -40 120 °C (Bluetooth)	Item number: 12903-00	16 units
Cobra SMARTsense – CO <sub>2</sub> , 0 100000 ppm (Bluetooth + USB)	Item number: 12932-01	8 units
Cobra SMARTsense – Heart Rate, 30 200 bpm (Bluetooth + USB)	Item number: 12935-01	16 units
Cobra SMARTsense – EKG, 04,5 mV (Bluetooth)	Item number: 12934-00	8 units
SensorCase for Cobra SMARTsense	Item number: 12980-00	1 units
SensorCase Cobra SMARTsense, Biology, 16-fold	Item number: 12983-88	Set

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### **Cobra SMARTexperiments** ★ ←

Cobra SMARTexperiments PHYWE

Simple. Smart. Experiment.

Cobra SMARTexperiments contain all components and sensors necessary for measurement

All-in-one-experiment – no lengthy setup, no interface necessary!

- · Remove from cabinet
- Switch on
- Quick and intuitive measurement

3rd law of Newton	Item number: 12973-00
Hooke's law	Item number: 12970-00
Mathematical pendulum	Item number: 12972-00
Archimedes' principle	Item number: 12971-00
USB quick charger with 6 USB ports	Item number: 07934-99
measureAPP	Item number: 14581-61







### Cobra DigiCart \*

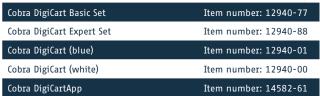
# Simple. Complete. Dynamic.



The All-in-One System Cobra DigiCart – the whole world of dynamics and kinetics in one set.

- 8 experiments in Basic set and additional 4 experiments in Expert-Set
- 4 integrated sensors (Force-, Speed-, Accelerationand Positionsensor)
- · Communication via modern Bluetooth technology
- Powerful, longasting Lithium-ion batteries with automatic charge protection
- Simple charging via USB





















### curricuLAB® 🖵 🕮

### Simple. Digital. Teaching.

With the new teaching and learning platform curricuLAB® PHYWE offers a fast and uncomplicated entry into digital teaching. With more than 1800 curriculum-compliant contents for all topics (physics, chemistry, biology or nature and technology), more than 400 in digital form, and thousands of additional contents curricuLAB® is one of the biggest experiment data bases for the digtal science lessons.





Awarded with the Comenius-EduMedia-Seal 2021 as a teaching and learning management system of outstanding pedagogical, content and design quality.

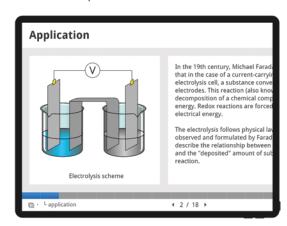
#### Something for everyone.

More than 4000 didactical based and interactive teaching and learning contents.



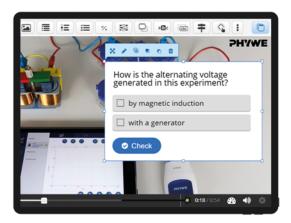
#### Learning content, that inspires.

Interactive and practical content motivates and makes you want more.



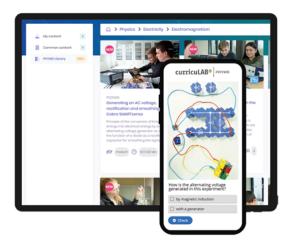
#### It could hardly be easier.

The intuitive editor makes every change a breeze.



# No limits to creativity.

Choose from more than 40 highly interactive content types to create your own content.



# Share content quickly and easy.

Sharing of content using links or QR codes that comply with data protection regulations.



### For all platforms and end devices.

curricuLAB® is platform-independent and runs on all Internet-capable end devices.



#### What our customers say:



Max Metelmann Schloß-Gymnasium Benrath, Düsseldorf

Would you like to test curricuLAB® without obligation?

Then get your free demo access in 2 minutes at www.curriculab.de.

"The new curricuLAB® combines classical, analogue experiments with digital innovations such as quiz questions and cloze texts in one document. This opens the doors for modern, digital and student-oriented teaching."



**Peter Gromes**Comenius-Schule,
Herborn

"curricuLAB® offers an excellent basis for student experiments in the classroom. A truly successful tool for the digital age."



**Marija Vlaski** Adorno-Gymnasium, Frankfurt am Main

"With curricuLAB® we can easily prepare our learning content in a digital and modern way - for teaching and working at home. We can create the content in the student council and then quickly adapt it individually according to the personal ideas of our colleagues. For us this is a real workload reduction!"

curricuLAB® Single license Item number: 14578-62

curricuLAB® School license Item number: 14577-62

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### measureAPP 💶 ios 🖷 🖵 🗓



### Simple. Mobile. Measurement.

PHYWE measureAPP is the app for simple and fast data logging in your digital science education. In combination with our Cobra SMARTsense sensors we offer you an intuitive, simple and modern overall solution that leaves nothing to be desired.



Awarded the Comenius-EduMedia-Seal 2020 as an educational medium which is outstanding in terms of pedagogy, content and design.

#### So simple that it's almost too simple.

Quick and intuitive measuring (just 2 clicks for data recording).



#### Data exchange made easy.

Wireless data exchange and connection of Cobra SMARTsense sensors via bluetooth and USB.



#### Something for everyone.

Find and open more than 150 experiment descriptions directly in the app.



#### Your ideal companion.

Create individual notes, photos or videos to document the measurement results.

















measureAPP - the free measurement software for all devices and operating systems

Item number: 14581-61





### measureLAB # macOS -





# measureLAB PHYWE

### Simple. Precise. Measurement.

The software measureLAB assists you and your students with analyzing your experiment data: No matter if it's a simple integral or a fully automatic equivalence point calculation, measureLAB is the measuringsoftware of your choice. And more than 150 preconfigured experiments reduce your preparation time to a minimum.



#### Cobra Xpert-Link:

The high-end system for demanding measurements at high speed.

#### Professional measurements easy done.

Measurement speeds of up to 10 MHz, as well as extensive evaluation functions and data processing options.



#### Easy connections.

Wireless data transfer via Bluetooth, WLAN or USB.



#### Something for everyone.

Find and open more than 150 experiment descriptions directly in the software.











measureLAB multi user licence Item number: 14580-61

Item number: 12625-99 Cobra Xpert-Link

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### **Experiment sets for students (TESS)**

# TESS PHYWE

## Simple. Complete. Experiment.

Faculty/Subject		Topic	TESS Digitalset (Item number)	Number of experiments
SCIENCE		Substances in everyday use	15234-88D	15
		Mechanical devices in everyday use	15239-88D	12
		Electrical and magnetic devices in everyday use	15238-88D	15
		Water	15233-88D	14
		Heat	15235-88D	13
PHYSICS	Mechanics	Physical quantities, forces, simple machines,	25271-88D	32
	Thermodynamics	Temperature, thermal properties of liquids	25274-88D	21
	Electricity	Equipotential lines and electric field	15250-88D	5
		Simple circuits and electrical resistance,	25264-88D	28
		Electromagnetism	25269-88D	9
		Electric motor/Generator	15221-88D	10
		Renewable energies: basics and thermal energy	25287-88D	17
	Optics	Optical instruments	25277-88D	30
		Optics / Atom physics	15350-88D	16
	Radioactivity	Radioactivity	25261-88	11
CHEMISTRY		General chemistry	25300-88D	25
		Inorganic chemistry	25301-88D	35
		Acids, bases, salts	25302-88D	31
		Analytical chemistry	25303-88D	14
		Organic chemistry	25304-88D	36
		Polymer chemistry	15305-88D	18
BIOLOGY		Food chemistry	25306-88D	39
		Electrochemistry	30505-88D	23
		General biology	25296-88D	41
		Biochemistry and plant physiology	15620-88D	11
		Environment and outdoor	12626-88D	12
		Human- and Electrophysiology	25674-88D	9













Our experiment sets for students offer a simple, safe and time-saving solution for experimenting in digital science education.

There are 27 digital TESS sets available with 542 experiments. The sets contain everything your students need for a variety of experiments.







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### **Experiment sets for teachers (DEMO)**



### Simple. Complete. Demonstrate.

Faculty/Subject		Topic	TESS Digitalset (Item number)	Number of experiments
SCIENCE		Water	13234-88	5
		Heat	13236-88	5
PHYSICS	Mechanics	Physical quantities, forces, simple machines,	15510-88	24
		Force effect, friction, liquids and gases	15511-88	19
		Linear motion	15514-88	13
	Thermodynamics	Temperature, thermal properties of liquids,	15530-88	15
	Electricity	Simple circuits and electrical resistance,	15569-88	30
		Induction and electric motor	15571-88	24
		Electromagnetism	25574-88	8
		Electric motor/Generator	25573-88	8
		Semiconductor components	15572-88	27
		Renewable energies: basics and thermal energy	15580-88	17
		Solar cells, wind energy and hydropower	15581-88	17
		Fuel cells	15582-88	7
	Optics	Geometrical optics	15550-88	60
		Optical instruments	15560-88	5
		Wave Optics	15565-88	12
	Radioctivity	Radioactivity	15590-88	15
BIOLOGY		Biochemistry and Plant physiology	15620-88	11



Our experiment sets for teachers are perfect for demonstration of experiments in digital science lessons.

There are 19 digital DEMO-Sets available with 322 Experiments. The sets contain everything you need to perform the experiments.





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### **Our service**

# Simple. Reliable. Support.



#### **Product support**

- Online
- At site

#### Information center

- · Demonstration in our showroom in Göttingen/Germany
- Webinars
- Online-Workshops

#### **Customer support**

- Repair
- Spare parts
- Product support

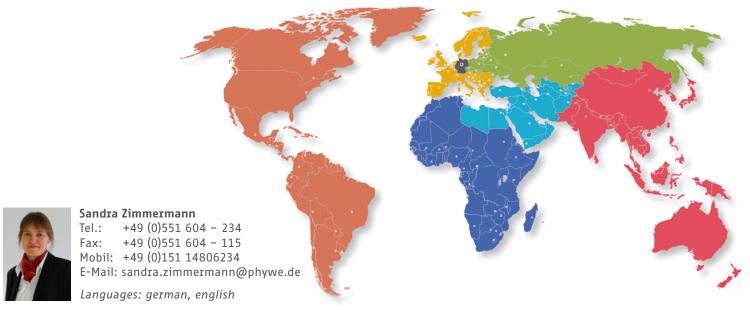
#### Services to book

- Inventory
- Placement service
- Trainings
- Online
- At site











Adriana García-Rojas
Tel.: +49 (0)551 604 - 144
Fax: +49 (0)551 604 - 115
Mobil: +49 (0)151 14818005
E-Mail: adriana.garcia@phywe.de

Languages: german, spanish



Can Acar

Tel.: +49 (0)551 604 - 323 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 14818008 E-Mail: can.acar@phywe.de

Languages: german, turkish, english, french



Mark Metzbaur

Tel.: +49 (0)551 604 - 245 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 14806233 E-Mail: mark.metzbaur@phywe.de

Languages: german, english



Vladimir Nabokoff

Tel.: +49 (0)551 604 - 231 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 14818004

 $\hbox{E-Mail: vladimir.nabokoff@phywe.de}\\$ 

Languages: german, russian, english



Jann Vallée

Tel.: +49 (0)551 604 - 137 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 14806220 E-Mail: jann.vallee@phywe.de

Languages: german, french, english, arabic



Inge Berger

Tel.: +49 (0)551 604 - 233 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 55009110 E-Mail: inge.berger@phywe.de Languages: german, russian



Vanessa Kniza

Tel.: +49 (0)551 604 - 140 Fax: +49 (0)551 604 - 115 Mobil: +49 (0)151 14818016 E-Mail: vanessa.kniza@phywe.de

Languages: german, english

#### PHYWE Systeme GmbH & Co. KG

Robert-Bosch-Breite 10 37079 Göttingen/Germany

T. +49 (0) 551 604 - 0

F. +49 (0) 551 604 - 107

info@phywe.com www.phywe.com











