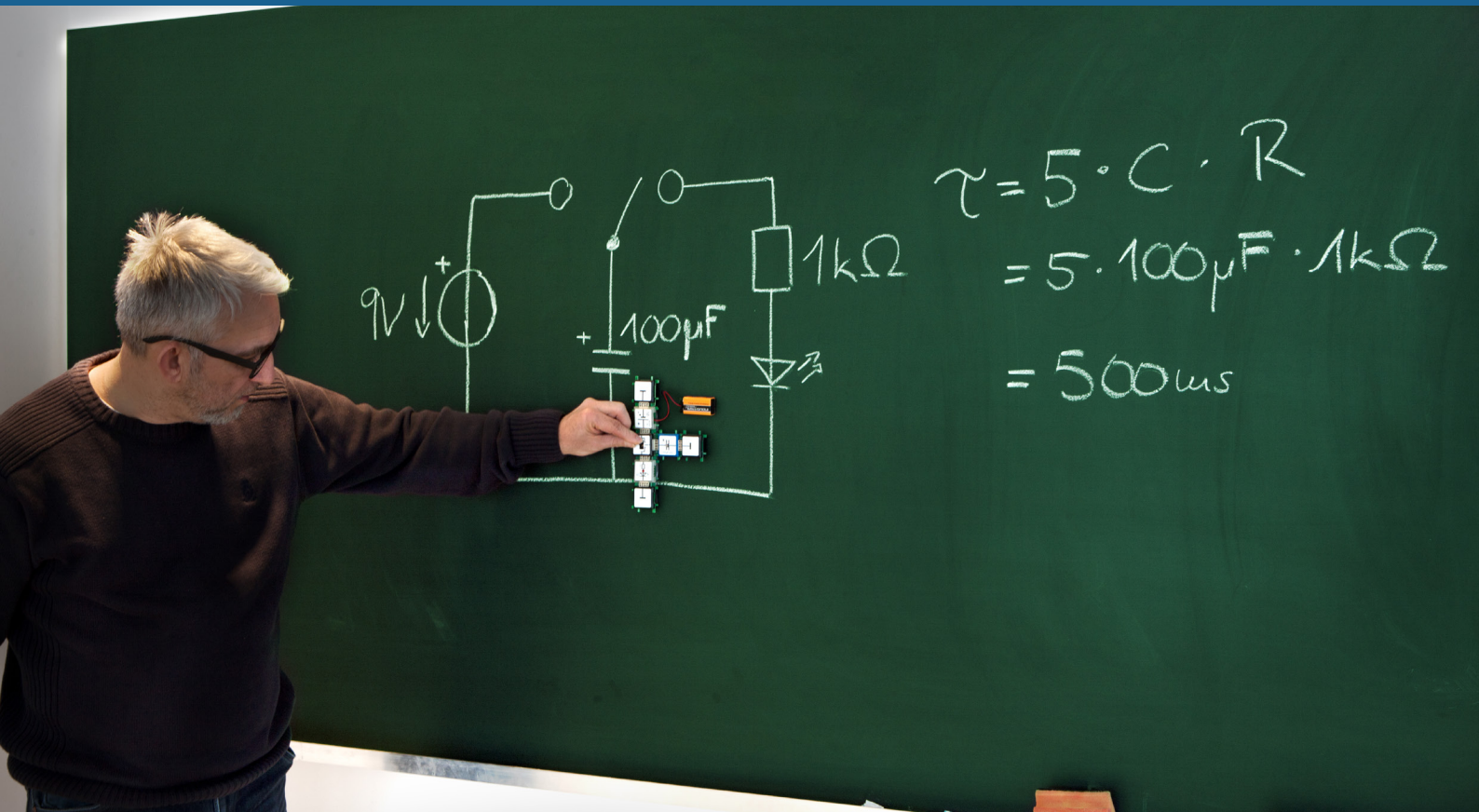




Brick 'R'  
knowledge

# Electronics & Coding Experiments in the classroom!



Kindergarten - Elementary School - High School - University - Professional Education

Science - Technology - Engineering - Mathematics

Part of the initiative

Everyone  
does



[allemachenmint.de/en](http://allemachenmint.de/en)



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## What is Brick'R'knowledge Education?

Brick'R'knowledge offers the opportunity to teach and learn the basics of electronics and, building on this, to explore a variety of applications. The system goes far beyond the basics of electronics. Microcontroller programming, understanding of solar energy, entering the Internet of Things, getting used to the logic of a computer or even the physics of a fuel cell make a multidisciplinary STEAM lesson an exciting experience for learners and teachers and convey competences of the new living and working world.

A real challenge in dealing with electronics in the classroom is the simple handling and visualization of electronic components. Breadboards are often used to build electronic circuits. These are difficult for learners to master. The documentation of more complex circuits is a challenge. In connection with the programming of microcontrollers this leads to a high time expenditure in the lessons, which cannot be used for programming.



## Brick'R'knowledge Learning Development

### Kindergarden & Elementary School

Light, electricity and renewable energies are the topics, which we offer for elementary school and kindergarden. The children learn to create their own light installations how electricity flows in a circuit, but also how electricity can be generated from sunlight and can be used. The main benefit of the bricks is that they are easy to handle. The size of the bricks and the simplicity and robustness of the system are helpful for the first attempts in the field

of electronics in this age group. The children learn first electronic components with the help of the stickers on the bricks and how they work in the experiments. They don't have to be able to read. The topic of renewable energies finally becomes „elementary school ready“ with the Solar Set. All sets are ideal for group projects, but also for individual lessons.

### High School

For High Schools Brick'R'knowledge offers a lot of different topics. The Basic Set and the Advanced Set can be used to teach basic and more in-depth electronics knowledge in physics or technology lessons. The High School Experiment Set for grades 7 and 8 was specially adapted for the German curriculum in cooperation with the University of Magdeburg. The supplementary Measurement Sets One and Two make it possible to perform current and voltage measurements in the circuits using standard measuring instruments. The Solar Set and Fuel Cell Set also bring the subject of renewable energies into the classroom. The focus here is not only on the physics of the solar modules or fuel cells but also on the necessary electrical steps to use these renewable energies in daily life. Many experiments can be conducted with the students here.

the world of programming, Brick'R'knowledge offers the Arduino Coding Set, which was developed together with Arduino, and the IoT Set. The Bio Feedback Set is an excellent way to offer multidisciplinary lessons in biology, physics and computer science. For technology lessons, the High Power LED Set is ideal for creating practical light installations in school. The sets with the ready-made bricks are supplemented with the DIY set and expanded so that the students can also solder their own designed additional bricks or that existing bricks can be easily repaired at school. Furthermore, the basics of computers can be taught with the Logic Set in a didactic and sequential way. Thus, the Brick'R'knowledge System can also be used to teach Boolean algebra, digital circuits or the functionality of a CPU. All sets are ideal for group projects, but can also be used in individual lessons.

To combine analog and digital electronics and enter into

in the fields of electrical engineering and computer science to teach students in a clear and practical way.

### College & University

The Brick Sets are also used at universities and colleges. For example, the Advanced and Logic Set are used at university



## Support for teachers

### Resources for your lessons

As a German manufacturer, we offer of course all instructions and comprehensive manuals in English for download. For many topics there are also short tests on the website, which can be filled out directly by the students.

### Personal contact and advice

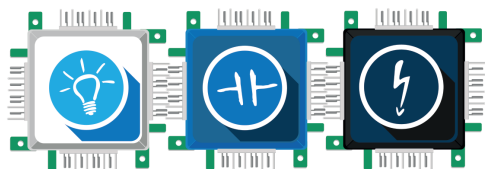
For any questions, the Brick'R'knowledge team or our local partners can be contacted. For complex setups, online meetings are also possible at any time. We also offer workshops for getting started with the system and to answer further questions.

## Brick'R'knowledge Basic Set

The Basic Set provides an easy and understandable way to learn the basics of electronics. Topics from physics lessons such as Ohm's law, linear and parallel circuits are explained in a simple and clear way. Voltage dividers with fixed or variable resistors are introduced. In addition to the resistors, the set offers the possibility to experiment with capacitors and also with a transistor. The students get to know different options of a night light circuit. The set is also ideal for all those interested in Arduino® programming to get back into electronics.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



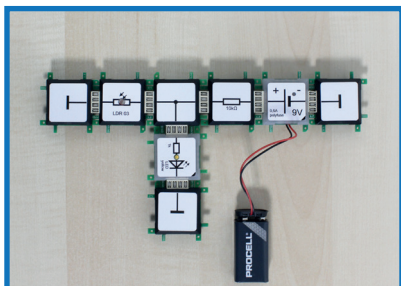
### Basic Set

**Educational fields:** General Knowledge (Primary School), Physics, Engineering, Computer Science

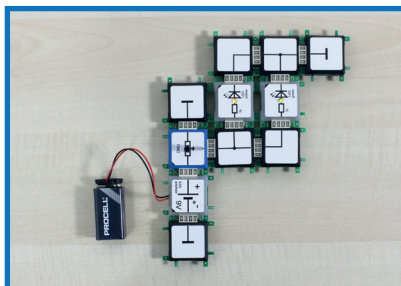
### Educational Content

- Basic understanding of electronic components and circuits
- Basic electronic knowledge
- Circuits and interrupted circuits
- Parallel and series circuits
- Polarity measurement
- Resistors in parallel and series connection
- Potentiometer as voltage divider
- LDR photosensitive resistor
- Capacitors as energy storage
- Transistors as amplifiers and switches
- Adjustable night light
- Transistors in collector circuits

### Sample Circuits

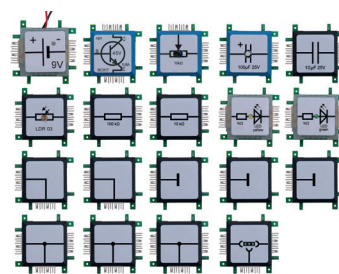


Automatic night light with LDR



Threshold voltage of LEDs

## Elementary School +



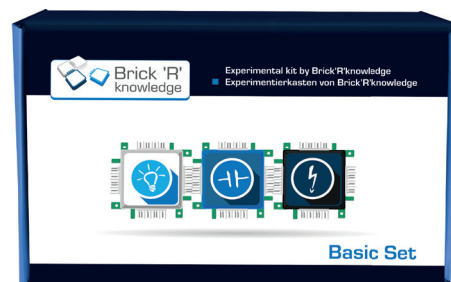
### Content

- 19x Bricks



### Overview

- Grades: 2-8
- Students per Kit: 4



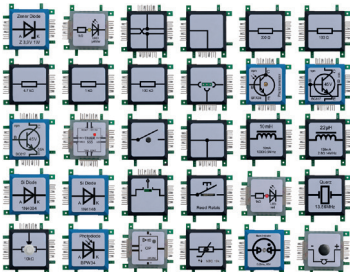
**Art.Nr.:** 139072

**SKU:** ALL-BRICK-0653

**MSRP:** 49,58 EUR excl. VAT



## High School +



### Content

- 111x Bricks



### Overview

- Grades: 7+
- Students per Kit: 4



Art.Nr.: 139073

SKU: ALL-BRICK-0654

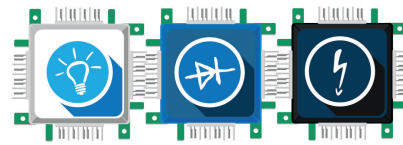
MSRP: 276,47 EUR excl. VAT

## Brick'R'knowledge Advanced Set

The Advanced Set is intended to give users the opportunity to build and further develop basic circuits of modern electronics. It contains all the basic components of „traditional“ analog electronics such as resistors, capacitors, coils, relays, piezos, loudspeakers, microphones, etc. These are completed by basic components of „modern“ semiconductor electronics such as various diodes, transistors, FET's, MOSFET's, timers etc. The set contains all Bricks of the Basic Set. It is designed for students, trainees and high school students who want to acquire a deeper knowledge of electronics.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



### Advanced Set

**Educational fields: Physics, Engineering, Computer Science, Professional Education, College & University Education, Ham Radio Training**

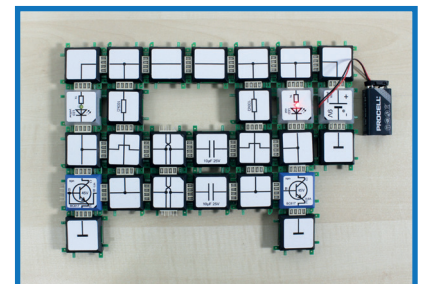
## Educational Content

- Deeper electronics knowledge
- Design of complex electronic circuits
- Digital logic with buttons, semiconductors, diodes and relays
- Resistors
- Capacitors
- Coils
- Transistors
- Field effect transistors
- Timer 555
- Oscillator circuits
- Operational amplifier
- Audio amplifier
- Relays
- Alarm circuits
- Thermocouples

## Sample Circuits



Microphone and audio amplifier



Astable multivibrator

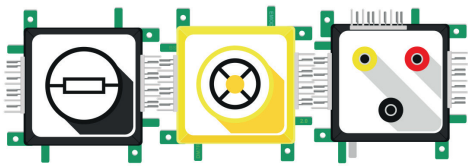


## High School Set 7/8

The set was designed in cooperation with the University of Magdeburg, Faculty of Computer Science, School IT and Digital Learning Tools and is specifically focused on the topics of electricity in High Schools in grades 7 and 8. The set has been adapted to the curriculum requirements at High Schools and is therefore ideal for practical exercises and experiments to support the theoretically learned subjects of the curriculum. It offers students the opportunity to independently gain practical experience with the topic of electricity in experiments.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



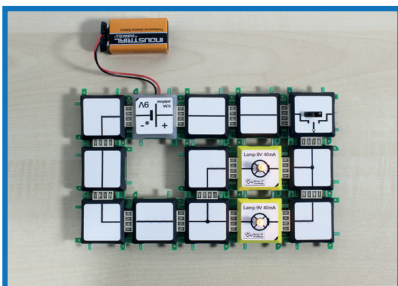
## High School Set 7/8

Educational fields: Physics

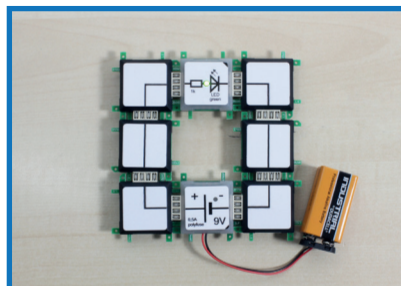
## Educational Content

- Basic understanding of electronic components and circuits
- Basic electronics knowledge
- Circuits and interrupted circuits
- Current flow direction
- Parallel and series connection
- Ohm's law
- Measurement of current and voltage in circuits
- Open circuit voltage of a battery
- Resistors
- Variable resistors

## Sample Circuits

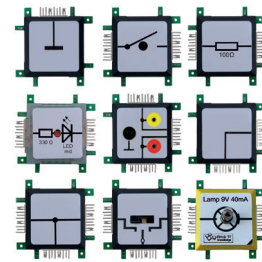


Parallel connection with light bulbs



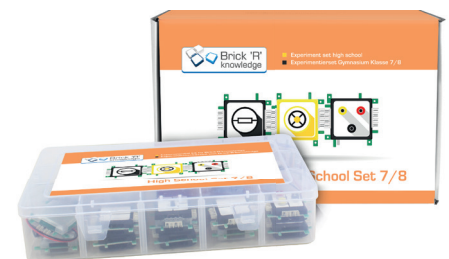
Circuit with LED & series resistor

## High School +



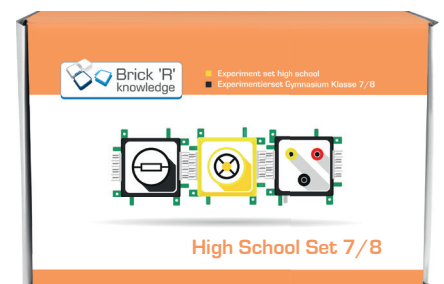
## Content

- 25x Bricks



## Overview

- Grades: 7-8
- Students per Kit: 1-2

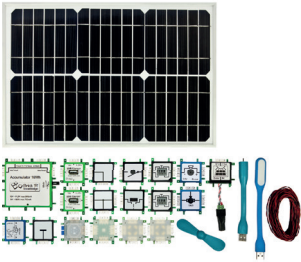


Art.Nr.: 189975

SKU: ALL-BRICK-0730

MSRP: 57,98 EUR excl. VAT

## Elementary School +



### Content

- 20x Bricks
- 1x Solar panel 15W
- 1x LED lamp
- 1x fan



### Overview

- Grades: 2+
- Students per Kit: 4



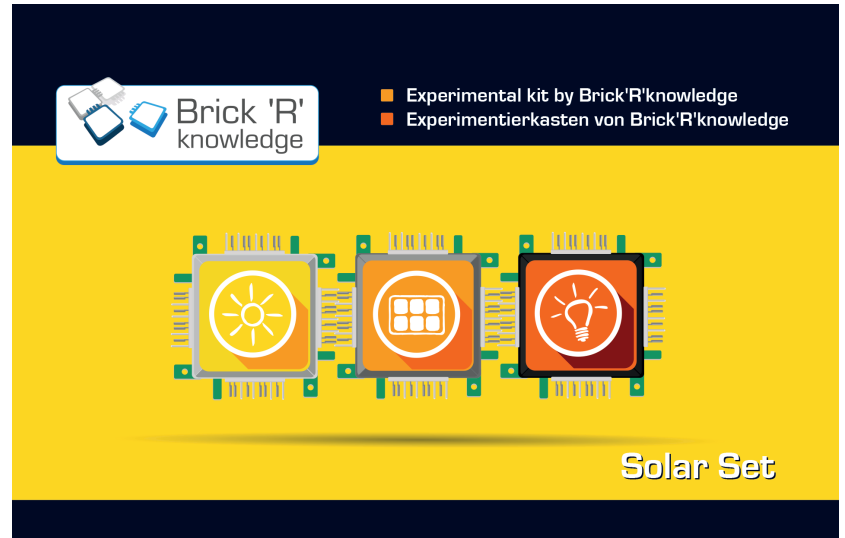
Art.Nr.: 139074

SKU: ALL-BRICK-0654

MSRP: 150,42 EUR excl. VAT

## Brick'R'knowledge Solar Set

An introduction to understanding the use of solar energy in everyday life can be made with the Solar Set. The set offers the possibility to perform electronic experiments directly with electricity from the solar module. In addition, an understanding of the energy turnaround using solar energy can also be developed using the Battery Brick. The topic of energy storage is addressed as well as energy transformation. The set offers the possibility to explore alternative energy concepts in a playful way by means of hands-on experiments. The enclosed handbook also serves this purpose and encourages to experiment and develop own ideas.

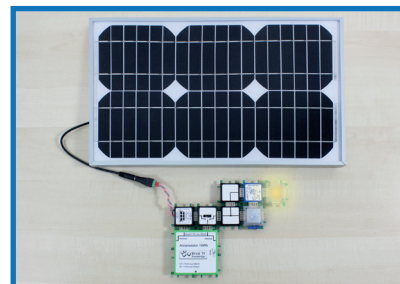


**Educational fields: General Knowledge (Primary School), Natural Sciences, Physics, Technology, Professional Education, College & University Education**

### Educational Content

- Construction of basic electronic circuits
- Photovoltaic system
- Light
- Motion
- Sound
- Energy
- Extension
- Charging a smartphone with solar power

### Sample Circuits



Charge by day - glow by night



Automatic night light with Motion detector

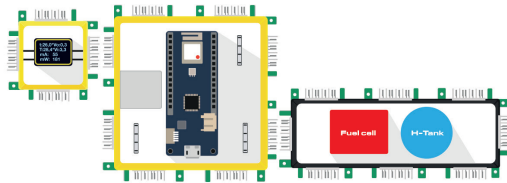
# Brick'R'knowledge Fuel Cell Set

The Fuel Cell Set makes it possible to learn in detail about an old alternative technology for power generation in the light of the energy turnaround or the search for new alternative propulsion concepts in road traffic. The fuel cell is integrated into the Brick system in such a way that both electronic experiments can be conducted with it and the physics of the fuel cell can be experienced and measured. In addition, the topic of uninterrupted power supply is also taught. The set offers the possibility to develop and understand own concepts of the energy transition by including further Brick Sets (e.g. Solar Set). All programs required for the operation of the set for the Arduino® are included. These can then be developed further, e.g. to monitor and control the system via the Internet.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge

## Fuel Cell Set - Wasserstoff-Brennstoffzelle



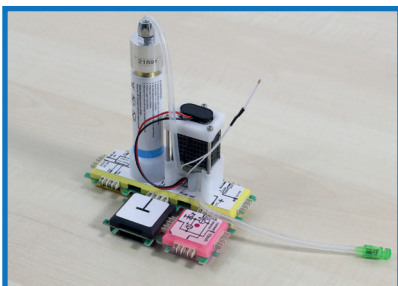
MKR WiFi 1010 Board inside!

**Educational fields: Natural Science, Physics, Chemistry, Engineering, Professional Education, College/University Education**

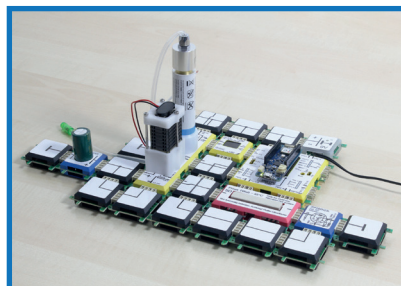
## Educational Content

- Deeper electronics knowledge
- Design of complex electronic circuits
- How does a fuel cell work?
- Introduction to various components
- Arduino MKR series presentation & Arduino IDE
- Coding the first programs
- I2C bus, analog to digital converter & OLED
- Different experimental setups with the fuel cell
- Hydrogen
- Circuit diagram of the fuel cell

## Sample Circuits

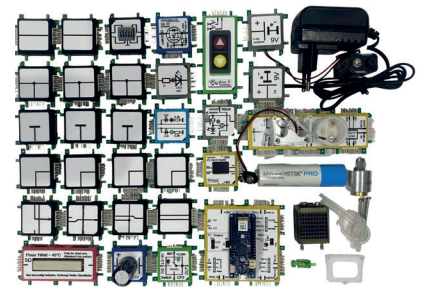


Commissioning of the Hydrogen fuel cell



Experimental setup with controlled current load

High School +



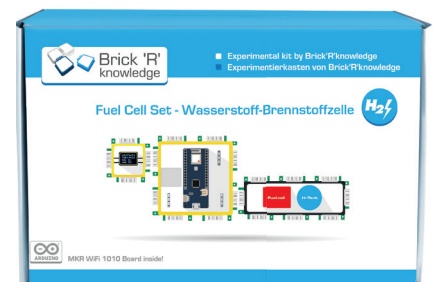
### Content

- 1x Fuel Cell
- 1x Arduino Board MKR WiFi 1010
- 1x Hydrogen storage with accessories
- 30x Bricks



### Overview

- Grades: 7+
- Students per Kit: 4



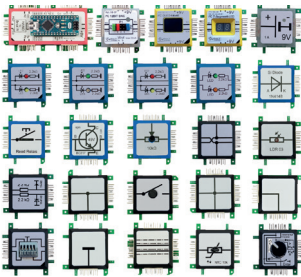
Art.Nr.: 180230

SKU: ALL-BRICK-0710

MSRP: 797,48 EUR excl. VAT



## High School +



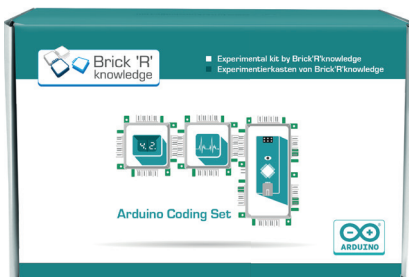
### Content

- 1x Arduino® Nano
- 45x Bricks



### Overview

- Grades: 7+
- Students per Kit: 1-2



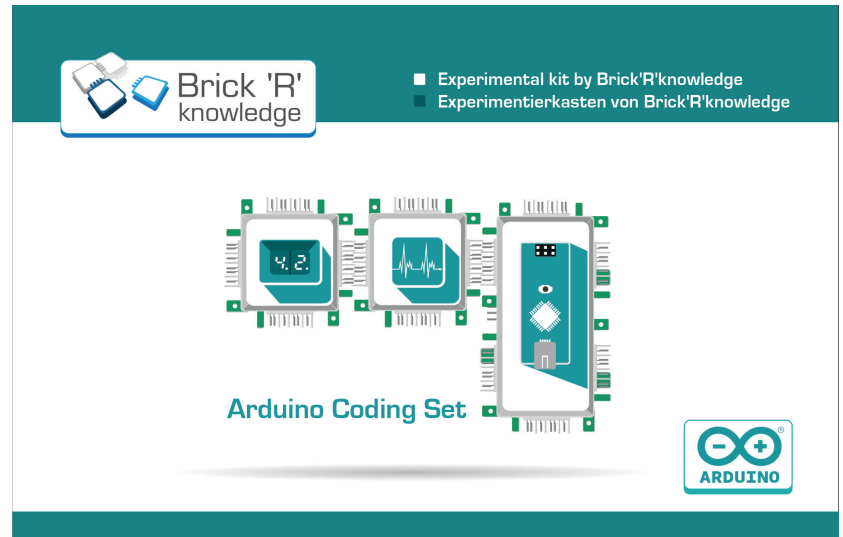
Art.Nr.: 182684

SKU: ALL-BRICK-0704

MSRP: 167,23 excl. VAT

## Brick'R'knowledge Arduino® Coding Set

Physical Computing simplified - the Arduino® Coding Set makes it easy to get started with Arduino® programming without the time-consuming and error-prone use of breadboards to build the circuit peripherals for Arduino® applications. Both the topics with I/O and analog pins can be presented with the set as well as the use of buses in programming. The corresponding necessary analog and digital Bricks and an Arduino® Nano Brick are included in the set. Comprehensive circuit and programming examples are supplied with the set. These can be expanded as required in the lessons.

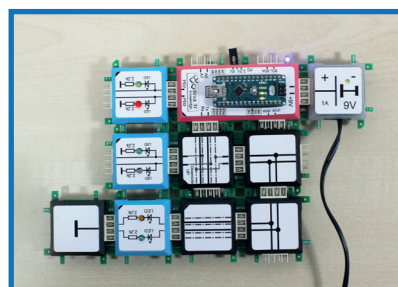


**Educational fields: Computer Science, Physics, Engineering, Professional Education, College & University Education**

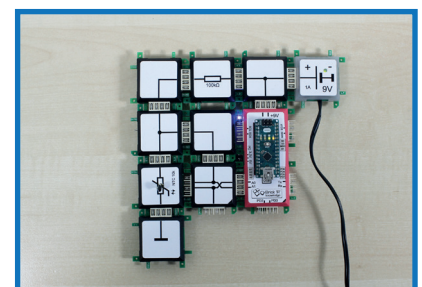
### Educational Content

- Programming your own code
- Design of complex electronic circuits
- LEDs & buttons
- Analog to digital converter
- I2C bus
- Buttons & Bouncing
- Relays
- Rotary encoder
- OLED
- Digital to analog converter
- Applications

### Sample Circuits



Simple running light

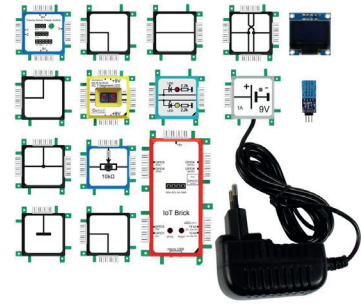


Measuring the temperature with NTC

# Brick'R'knowledge Internet of Things Set

The Internet of Things set makes it possible to learn about the principles of the Internet of Things and to develop own applications. It does not only teach how sensor data can be recorded with the Bricks, evaluated and forwarded to an own app via the Internet. The set also offers the possibility to initiate actions in the Brick circuits from an own app. The students learn how home automation can be implemented and take the first steps towards a networked school with an understanding of the Internet of Things. As a core building block, the set contains the IoT Brick based on an ESP8266. The set comes with extensive examples of circuits and code, which can then be expanded as required in the classroom.

## High School +



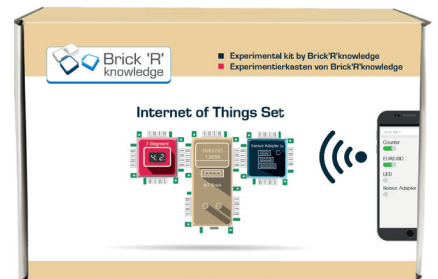
### Content

- 1x ESP8266 IoT Brick
- 12x Bricks
- 1x Manual



### Overview

- Grades: 7+
- Students per Kit: 1-2



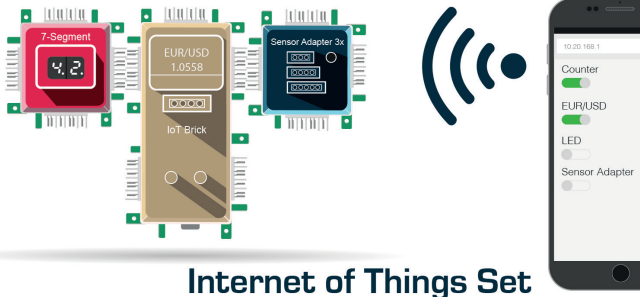
Art.Nr.: 182685

SKU: ALL-BRICK-0705

MSRP: 108,40 EUR excl. VAT



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



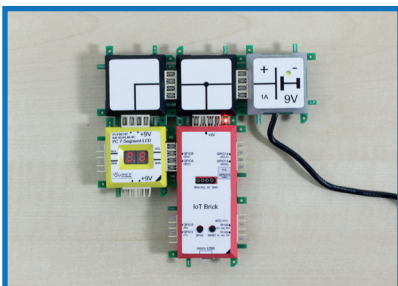
### Internet of Things Set

**Educational fields:** Computer Science, Physics, Chemistry, Environmental Technology, Engineering, Professional Education, College/University Education

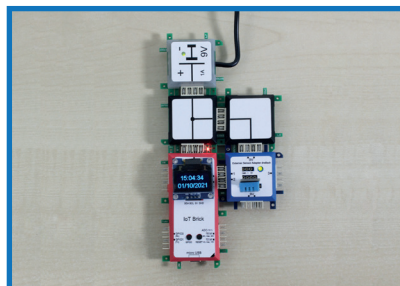
## Educational Content

- Deeper electronics knowledge
- Design of complex electronic circuits
- IoT Brick & Arduino IDE
- I2C Bus, OLED-display & analog inputs
- IoT Brick as WiFi client
- Fetching time from the Internet
- Measuring temperature & humidity
- Fetching the current dollar rate from the Internet
- My first website
- Switching via website

## Sample Circuits

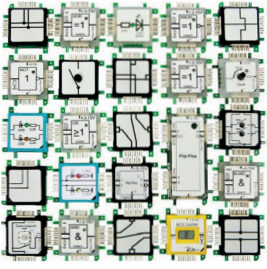


7-segment display as counter



Measurement of temperature and humidity with DHT11

## High School +



### Content

- 93 Bricks



### Overview

- Grades: 7+
- Students per Kit: 4



Art.Nr.: 139075

SKU: ALL-BRICK-0656

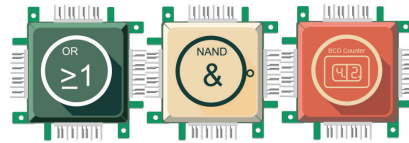
MSRP: 419,33 EUR excl. VAT

## Brick'R'knowledge Logic Set

The Logic Set offers the possibility to learn Boolean algebra not only theoretically but also to explore it in physical circuits. This makes the set very useful in mathematics lessons. However, the set goes far beyond Boolean algebra with logic gates. Students are shown how a modern computer calculates based on binary numbers. Half and full adders can be built and their behavior can be studied. Besides the logic gates, the set contains various flip-flops to build and investigate up and down counters or shift registers. The set also introduces into specific topics of digital electronics, like debouncing switches.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



## Logic Set

**Educational fields: Mathematics, Computer Science, Physics, Engineering, Professional Education, College & University Education**

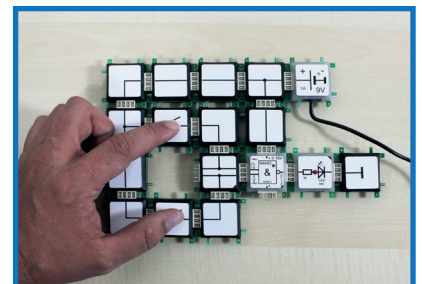
### Educational Content

- Deeper electronics knowledge
- Design of complex electronic circuits
- Fundamentals of digital circuit technology
- Basic circuits
- Debounced switches
- Digital calculator
- Flipflops
- Shift registers
- Counters

### Sample Circuits



1-bit full adder

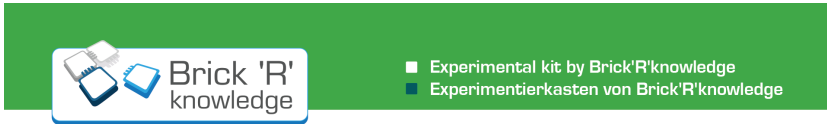


NAND gate

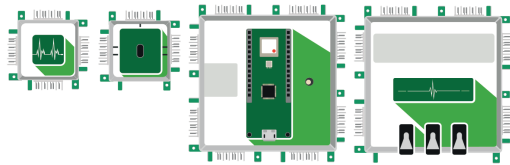


# Brick'R'knowledge Bio Feedback Set

The Bio Feedback Set offers an excellent combination for application-oriented computer science and biology lessons. With the set, biological measurements on the human body can easily be performed. In addition to measuring the pulse and blood oxygen, the set can also be used to measure and display heart activity (ECG), muscle activity (EMG) and brain activity (EEG) in various stress scenarios. An Arduino® MKR WiFi 1010 Brick serves as the core of the set. All necessary programs are supplied in detail and can then be further developed and adapted as required. The data is either displayed on the OLED display or forwarded via WiFi to an app to be created for evaluation. Besides the understanding of human biology the set also offers the possibility to trigger actions e.g. via brain waves (e.g. switching an LED).



## Bio Feedback Set

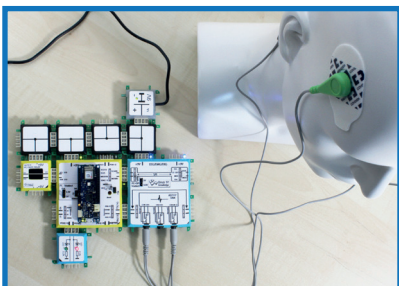


**Educational fields: Biology, Computer Science, Sports, Physics, Engineering, Professional Education, College & University Education**

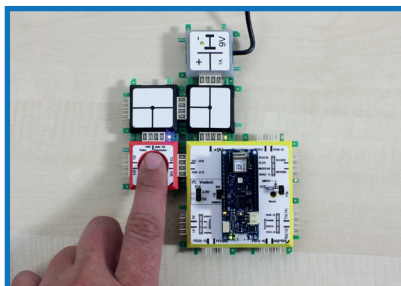
## Educational Content

- Deeper electronics knowledge
- Design of complex electronic circuits
- Getting started & programming with Arduino
- Analog to Digital Converter & OLED
- Pulse oximeter for measuring the pulse and oxygen content of the blood
- ECG measurement, the heart & ECG experiments
- EMG measurement & experiments
- EEG measurement & experiments

## Sample Circuits

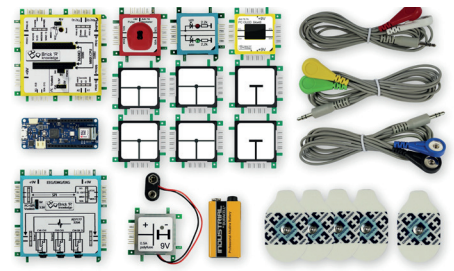


EEG measurement: Mind-Control of a LED



Pulse Oximeter

## High School +



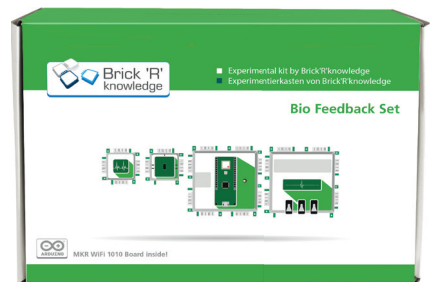
### Content

- 1x Arduino Board MKR WiFi 1010
- 14x Bricks
- 30x EEG / ECG / EMG Pads



### Overview

- Grades: 7+
- Students per Kit: 1-2

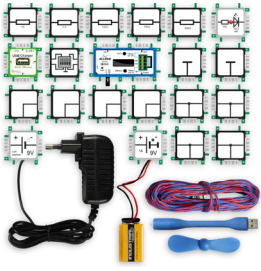


**Art.Nr.:** 168071

**SKU:** ALL-BRICK-0703

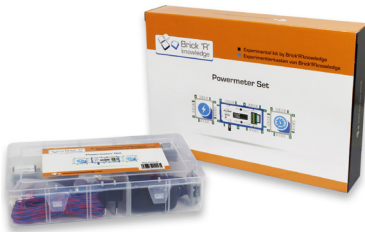
**MSRP:** 150,42 EUR excl. VAT

## High School +



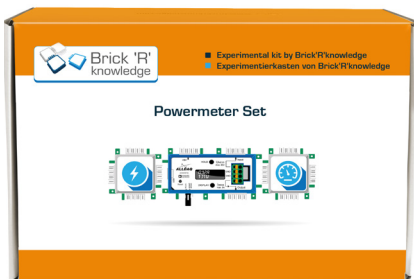
### Content

- 22x Bricks



### Overview

- Grades: 7+
- Students per Kit: 1-2



Art.Nr.: 155536  
SKU: ALL-BRICK-0696  
MSRP: 108,40 EUR excl. VAT

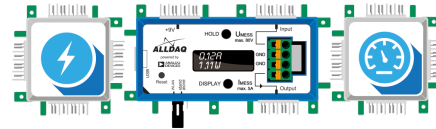
## Brick'R'knowledge Powermeter Set

The Powermeter Set offers the possibility to go deeper into the topic of current and voltage measurement in electronics. The basic understanding of current and voltage measurement devices is provided by the set itself. Not only simple series and parallel circuits are covered by the set but also resistor networks. Students will also learn to understand and measure the star-delta transformation of bridge circuits mathematically. The set can be easily combined with the Advanced Set.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge

### Powermeter Set

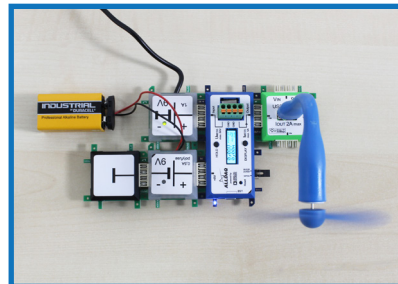


Educational fields: Physics, Mathematics, Engineering, Computer Science, Professional Education, College & University Education

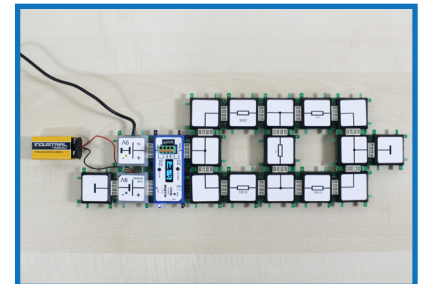
### Educational Content

- Construction of basic electronic circuits
- Introduction to the electronic components
- Voltage measurement
- Current measurement
- Circuit examples
- Resistor networks

### Sample Circuits



Measurement of the current at a voltage transformer



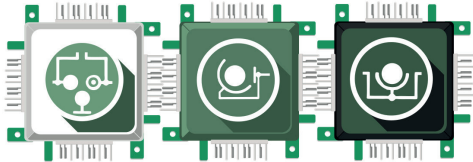
Measurement of the total resistance in of a bridge circuit by the delta-star conversion

## Measurement Set One

The Measurement Set One offers the possibility to easily measure voltage, current and other parameters in Brick'R'knowledge circuits with standard measuring instruments. The Bricks offer connection possibilities for 2 mm and 4 mm measurement adapters in different configurations.



■ Experimental kit by Brick'R'knowledge  
■ Experimentierkasten von Brick'R'knowledge



### Measurement Set One

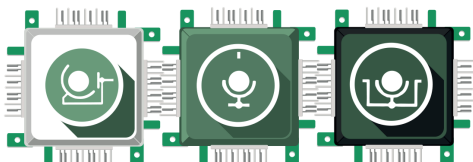
**Educational fields:** Physics, Computer science, Engineering, Professional Education, College/University Education, Ham Radio Training

## Measurement Set Two

The Measurement Set Two offers the possibility to easily measure voltage, current and other measured parameters with standard measuring instruments in Brick'R'knowledge circuits. The Bricks offer connection possibilities for 4 mm measurement adapters in different configurations.



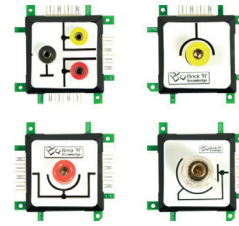
■ Experimental kit by Brick'R'knowledge  
■ Experimentierkasten von Brick'R'knowledge



### Measurement Set Two

**Educational fields:** Physics, Computer science, Engineering, Professional Education, College & University Education, Ham Radio Training

## High School +



### Content

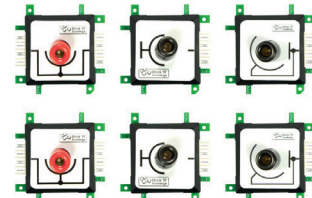
- 4 Bricks



**Art.Nr.:** 136818

**SKU:** ALL-BRICK-0637

**MSRP:** 12,60 EUR excl. VAT



### Content

- 6 Bricks



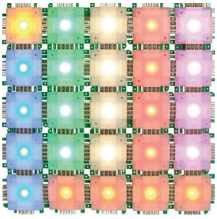
**Art.Nr.:** 136820

**SKU:** ALL-BRICK-0638

**MSRP:** 19,32 EUR excl. VAT



## Kindergarten +



### Content

- 29x Bricks



### Overview:

- Grades: Kindergarten +
- Students per Kit: 4



Art.Nr.: 124344

SKU: ALL-BRICK-0398

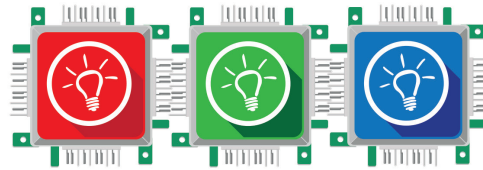
MSRP:: 66,39 EUR excl. VAT

## 7 Color Light Set

Creative application and use of electronics is the subject of the 7 Color Light Set. Already in the kindergarten area, colors can be learned with this set and colorful two- and three-dimensional objects can be created and made to light up in color. Own LED projects in art lessons and first experiences with electronics make this set an ideal start for STEM and arts.



- Experimental kit by Brick'R'knowledge
- Experimentierkasten von Brick'R'knowledge



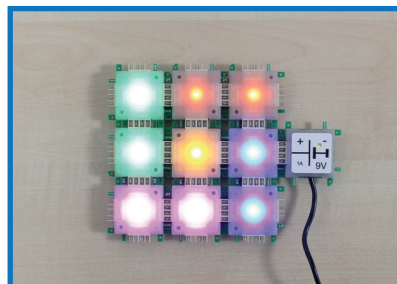
## 7 Color Light Set

Educational fields: Arts, General Knowledge (Primary School), Technology

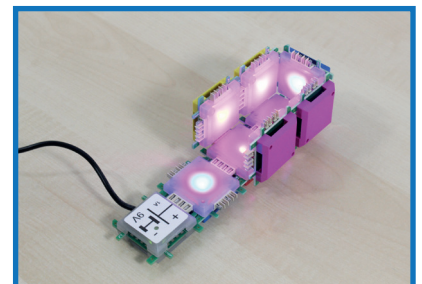
### Educational Content

- Light and colors
- Creative design with different lights
- Designing shapes and figures with colorful & glowing Bricks
- Light installations as room decoration
- Fine motor skills when combining the Bricks
- Two- and three-dimensional design

### Sample Circuits



LED matrix



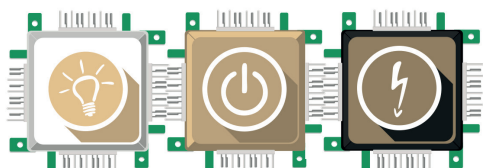
Light tunnel

## Highpower LED Set 50

With the Highpower LED Set lighting solutions for daily use can be designed and created. No matter whether direct or indirect lighting concepts in combination with switches or motion detectors are to be discovered and tried out. The 1 Watt Highpower LED Bricks provide enough light to realize real projects with them.



Experimental kit by Brick'R'knowledge  
Experimentierkasten von Brick'R'knowledge



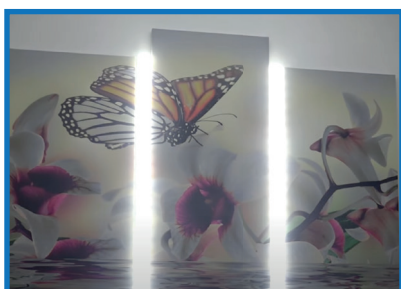
### Highpower LED Set 50

Educational fields: Arts, Technology, Professional Education

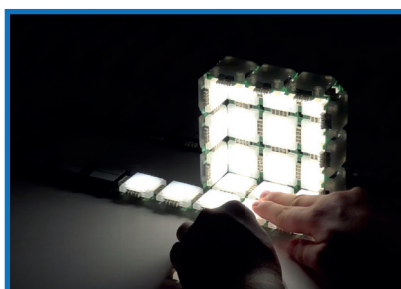
### Educational Content

- Creative design with lights
- Light installations
- Technical and architectural aspects of interior lighting
- Interior design
- Two- and three-dimensional design

### Sample Circuits

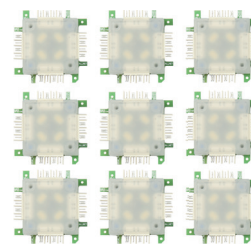


Indirect ambience lighting



Extendable light installation

High School +



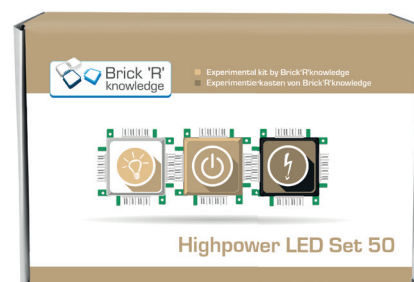
### Content

- 51 Bricks



### Overview:

- Grades: 7+
- Students per Kit: 4



Art.Nr.: 124449

SKU: ALL-BRICK-0399

MSRP: 200,84 EUR excl. VAT



Part of the initiative



[allemachenmint.de/en](http://allemachenmint.de/en)



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