senseBox

A do-it-yourself toolkit for stationary and mobile sensor stations.
Digital education in STEM subjects.

www.sensebox.de

www.opensensemap.org

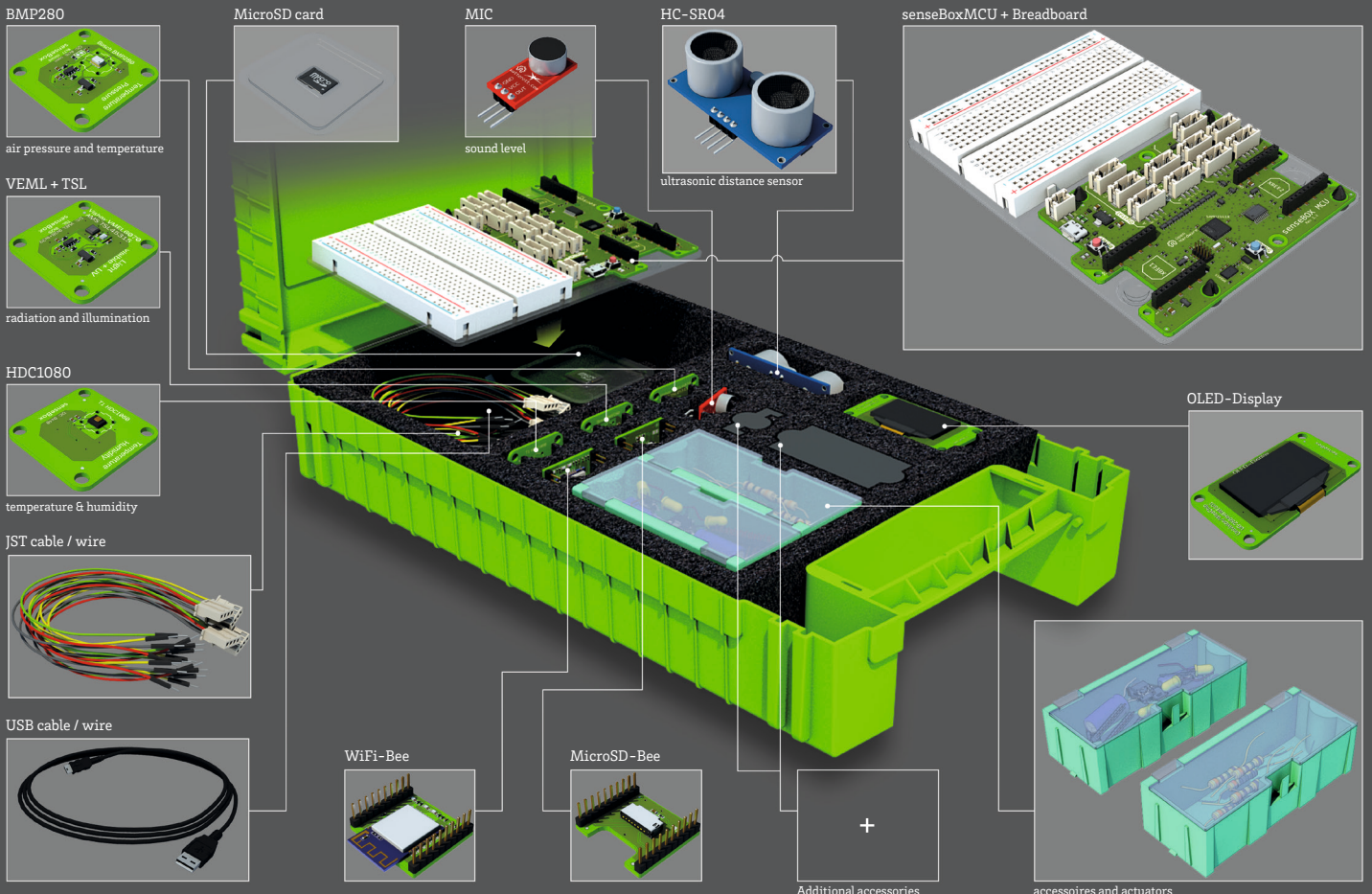
facebook.com/sensebox.de/

twitter.com/sensebox_de

« go social

Content

senseBox:edu	04
Graphical programming	06
Open Educational Resources	08
senseBox:home	10
open**Sense**Map	12
About us	14


BMP280
air pressure and temperature
MicroSD card
MIC
sound level
HC-SR04
ultrasonic distance sensor
senseBoxMCU + Breadboard
VEML + TSL
radiation and illumination
HDC1080
temperature & humidity
OLED-Display
JST cable / wire
USB cable / wire
WiFi-Bee
MicroSD-Bee
+
Additional accessories
accessoires and actuators

senseBox:edu

CeBIT INNOVATION AWARD 2017

» Programming and experimenting with environmental sensors

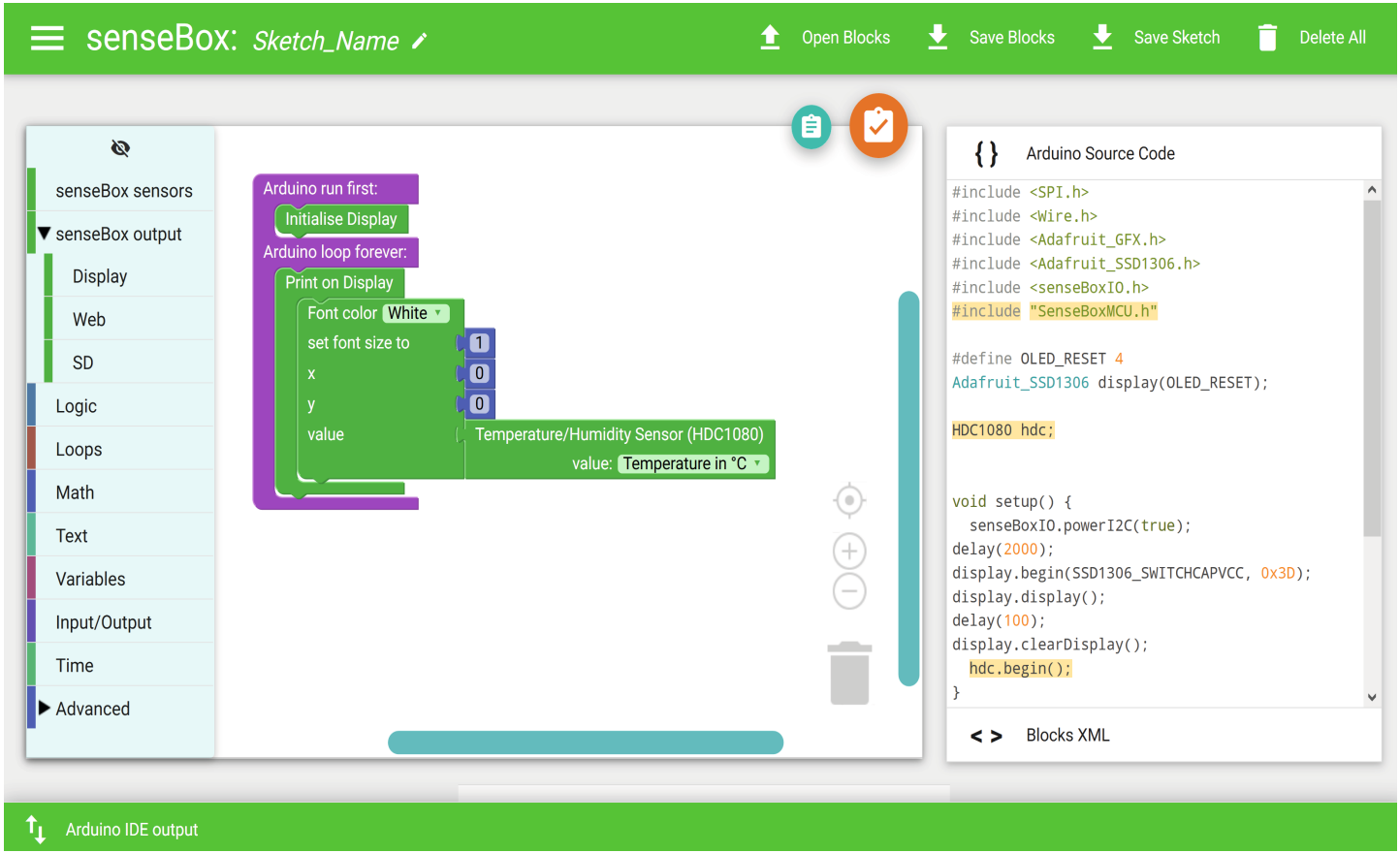
The senseBox:edu is our electronic kit for schools and young researchers, where the focus is on experimenting and programming using sensors. In addition to a programmable open-source microcontroller unit (MCU) based on the Arduino platform, sensors, components for transferring data to the Internet and other accessories are supplied.

With the senseBox:edu you can learn the basics of computer science with real problems from the whole STEM area. You will learn how to program different measuring instruments with little effort. This makes senseBox an optimal school material and is already used in many schools and universities.

Sensors for measuring various environmental phenomena, such as temperature, humidity, air pressure, illuminance, UV radiation, volume, distance, inclination and orientation allow creative work on a wide range of topics. Using the WiFi module, measured values can be transferred to our web platform for open sensor data, the openSenseMap, using the WiFi module. With openSenseMap you can publish all measurements taken with your senseBox and access over a million data sets from thousands of senseBox stations without charge (see page 12). The senseBox:edu can be used in secondary schools for pupils aged 10 and above.

By integrating it into different teaching units, for example:

» Weather, climate and climate change
» Light and environmental pollution
» Internet of Things
» Getting Started with Programming
» Measurement and evaluation



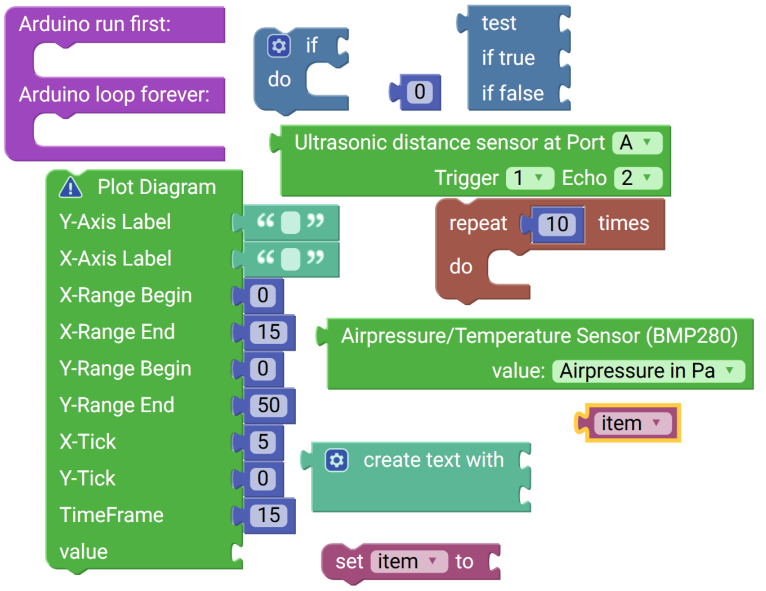
https://sensebox.de/en/blockly

Graphical **programming**

» Blockly for senseBox

With a graphical programming interface we have developed a simple method to program the senseBox. For this purpose, blocks for the individual components and functions of senseBox:edu were integrated into the Blockly system. The individual sensors can be easily read without working with source code and the values can be displayed on the OLED Display. The Arduino source code is displayed in parallel. Blockly for sense-Box is available on the web and as download for Mac and Windows.

For advanced applications the senseBox:edu can also be programmed directly in the Arduino IDE (programming environment of Arduino) in the traditional way.



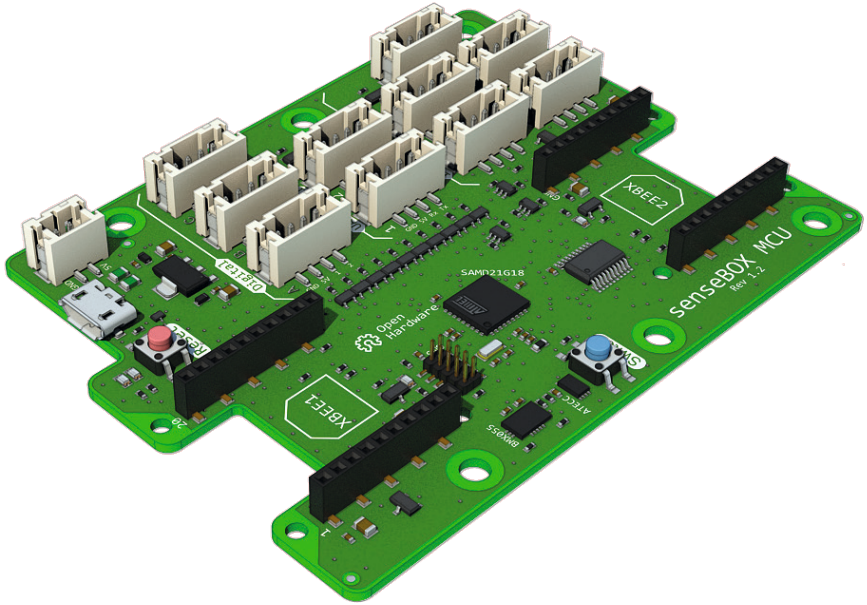
https://sensebox.de/en/material

Open **Educational** Ressources

» **Instructions from and for the community**

The idea of senseBox:edu was developed as a product within workshops for pupils, students and teachers at the student laboratory at the GI@School Lab at the Institute for Geoinformatics in Münster. Basis course concepts and projects from these workshops were documented and adapted aiming the usage in school lessons. You can find a lot of manuals, videos and documentation material about the senseBox under open licenses.

Together with scientists, schools and the Open-Hardware community, we are constantly improving and expanding the documentation.

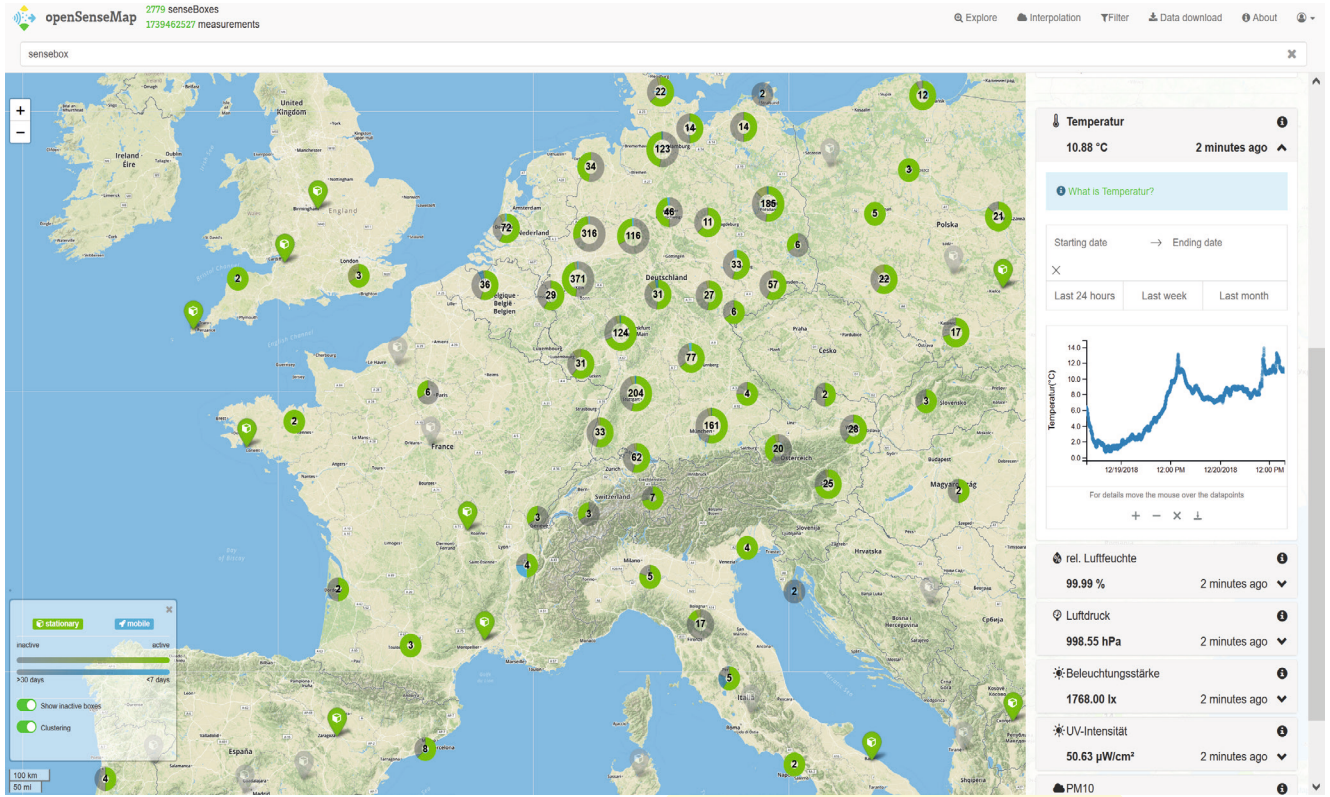


senseBox

senseBox:home

» Open source environmental measurement technology as a kit for home use

The idea for senseBox:home was developed in the context of Citizen Science research at the Institute of Geoinformatics at the University of Münster. The aim of this research is to establish a large and close-meshed sensor network with the help of public participation in order to facilitate access to environmental data for both scientists and the public. In the meantime, the senseBox project together with its data platform openSenseMap (p.12) has grown to one of the most successful and multiple award-winning open-source initiatives in the research field of Citizen Sciences. Due to the open approach and the do-it-yourself character, the project offers the possibility to deal with innovative sensor technologies, programming and the Internet of Things without any previous knowledge. Which phenomena are measured and how data is transferred can be adapted modularly to many applications. The range is constantly being expanded with new sensors and components. Each new measuring station helps to describe environmental phenomena in a local context and to develop new questions or to improve climate models. Join-in the research and set up your own senseBox:home environmental measuring station.



https://opensensemap.org/

openSenseMap

» **Publish, share, download and analyze sensor data**

The openSenseMap is an open data platform for any kind of location-related measurement data. The result is an open and comprehensive measurement data network, which is freely available for everyone. The senseBox:edu can be registered in a few steps. Assuming Internet access, the measurements carried out are then automatically uploaded and displayed. The openSenseMap offers various online analysis tools and allows users to download or visualize the data. On the openSenseMap you cannot only find data that were recorded with senseBoxes, but also data from other measuring stations. These features make the openSenseMap the first contact point for open sensor data.

The senseBox team at the annual hackathon for children and teenagers from the Münster region.

About **us**

» Motivation and outlook

The senseBox was developed within a BMBF research project at the Institute of Geoinformatics at the University of Münster. The resulting project and research work have won several awards in the university competition of the Federal Ministry of Education and Research (BMBF) (2013, 2014 and 2016). In addition, the senseBox:edu received the special prize for Digital Learning and Teaching at the CeBIT Innovation Award 2017.

In 2018 Reedu GmbH & Co KG was founded as a spin-off from the research project. Reedu ensures that further development and distribution of the senseBox scale with the increasing demand for citizen science tools in education and society. Reedu is supported by the Federal Ministry of Economics and Energy and the European Social Fund as part of the EXIST programme. The spin-off could win already awards in its first year of operation, such as the frist place in the GERMAN EDU Start-up Pitch at Didacta 2018.

The awards and especially the positive feedback from the public encourage us to develop the project together with the community into a pioneering project for digital education and citizen science.

The senseBox can easily be ordered online at https://sensebox.kaufen.

Sponsors & Contact

Westfälische Wilhelms-Universität Münster

ifgi
Institute for Geoinformatics
University of Münster

GI@SCHOOL

Make Light
Photonik selber machen

Bundesministerium für Bildung und Forschung

re:edu
reengineering education

senseBox

Bundesministerium für Wirtschaft und Energie

eXIST
Existenzgründungen aus der Wissenschaft

ESF
Europäischer Sozialfonds für Deutschland

Europäische Union

Zusammen.
Zukunft.
Gestalten.

re:edu GmbH & Co. KG
Institute for Geoinformatics

University of
Münster

Heisenbergstraße 2
48149 Münster

+49 (0)251 83 33 166
info@sensebox.de