fischertechnik

Education Solution Guide

Develop Future Skills with STEM Hands-On Solutions
from Primary to Higher Education

www.fischertechnikwebshop.com

CONTENTS

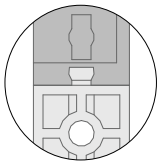
Overview and fischertechnik Building Block 2
Hands-on learning with fischertechnik 3
Teacher Support & Partnerships 4
Interview 5

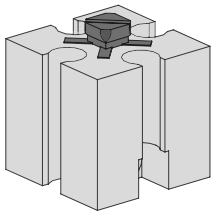
	Robotics & AI	Renewable Energies	STEM World	Maker	Factory Simulation
PRESCHOOL & PRIMARY SCHOOL Playfully explore first STEM and robotics concepts	p. 7	p. 21	p. 24		
SECONDARY SCHOOL Enhance future skills and learn hands-on about physics, technology and sustainability	p. 9	p. 22	p. 27	p. 31	p. 39
UNIVERSITY & HIGHER EDUCATION Master future technologies with comprehensive hands-on learning solutions	p. 39		p. 39	p. 31	p. 39

Open Roberta 15
WRO - Robotics in Competitions 16
Controller & Apps 18
After School Programs with fischertechnik 34
Creative Boxes & Design Studio 36
Additional Components 37

The fischertechnik building block

STABILITY
The pin and groove joint creates a strong connection between the building blocks.





VERSATILITY
Allows the construction of additional building blocks on all six sides.

CREATIVITY
There are endless creative opportunities for your creations.

Understanding **FUTURE SKILLS** with hands-on learning

Happy Birthday, fischertechnik! – Since 1965, fischertechnik has been offering hands-on and curriculum-relevant STEM learning concepts for cross-disciplinary use in preschools, general education schools, universities, and vocational training worldwide. This empowers students to develop essential future skills like problem-solving and creative thinking, preparing them to shape the world of tomorrow.

60 1965 2025

FUTURE SKILLS

Digital Skills

STEM Skills

Social and Emotional Skills

HARDWARE & APP

Explore technical components from everyday life

Skill-based programming with fischertechnik apps

BUILD AND LEARN

Realistic building with strong building blocks

Robust storage and simplified sorting

TEACHER SUPPORT

Extensive supporting materials and lesson plans

Building and programming instructions, tasks, and video tutorials

Hands-on learning is for life

When students are agents in their learning, they are more likely to have "learned how to learn" – an invaluable skill that they can use throughout their lives.

OECD Learning Compass 2030

Learn holistically with hands, heart, mind and all senses.

Relate the task to everyday life for real-world relevance.

Actively engage and drive the learning process.

Collaborate, work in a team and jointly share responsibility for the learning outcome.

Create tangible and meaningful results.

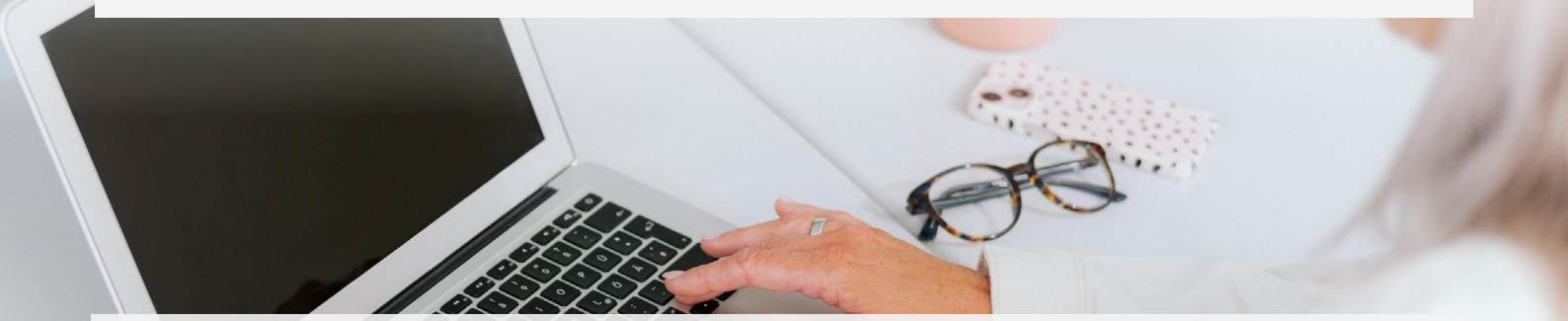
Reflect on the learning process

Teacher Support

All fischertechnik learning concepts are developed in close collaboration with teachers, educators, didactic specialists, and industry experts. They are tailored to the specific school type and grade level and aligned with educational curricula.

The right support for your teaching projects:

- Step-by-step guides
- Introduction to the fischertechnik building block and videos for an easy start
- Extensive content, including topic introductions to all STEM concepts, hands-on learning, future skills, technical components, and software environments for all relevant platforms
- Teaching materials, including curriculum references, worksheets, building and programming instructions (also available in the app), solutions, and structured outlines
- Suitable packaging and storage solutions for all learning concepts
- Expert advice and training opportunities through fischertechnik or certified retail partners
- Easy reordering of individual parts through fischertechnik or certified retail partners



Partnerships

WRO WORLD ROBOT OLYMPIAD™

Klett MEX

Fraunhofer IAIS

Future Classroom Lab by European Schoolnet

worlddidac ASSOCIATION Where Education Comes Together

technika

INTERVIEW

with Dr. Ralph Hansmann

Dr. Ralph Hansmann is an Academic Councilor at the Institute for Physics and Technical Education at the University of Education in Karlsruhe. Before, he was a teacher at primary and secondary schools, teaching subjects such as physics, technology, computer science, and sports.

Dr. Hansmann, you have been using fischertechnik since your teacher training and successfully passed your teaching exam with it. Nowadays, you train future teachers yourself and continue to use fischertechnik extensively. What makes fischertechnik special for you?

For me, fischertechnik stands for quality, innovation, creativity, reliability, and sustainability – in the present-day sense as well! The flexible and precisely manufactured parts can not only be clicked, pushed, and screwed together, but they can also be freely combined beyond their intended use. This makes fischertechnik the most valuable teaching material I can imagine. Regardless of age, language, or gender, children and young people manage to overcome natural obstacles in order to work towards a goal. Particularly, the ability to approach a teaching challenge quickly, easily, and with minimal effort opens up unexpected possibilities. In this way, learners can engage individually with the "Nature of Science." Observing themselves, forming their own ideas, testing or verifying them, experimenting, possibly revising, etc., to then develop solutions or improvements independently or with a partner or team, is of great importance and significance for personal development and learning.

How do you think teachers benefit from using fischertechnik learning concepts in their teaching?

For teachers, I find the didactic preparation of the material highly beneficial. For every topic-specific building kit, fischertechnik provides knowledgeable and well-founded information on its website. In addition, teaching plans with curriculum alignment are offered, which can be directly applied in the classroom. Combined with the quickly built models, lesson preparation becomes simple, effective, and efficient. Almost every curriculum-relevant topic is covered by fischertechnik, with the corresponding kit and potentially an associated app. Topics range from mechanics to robotics and artificial intelligence, from electronics to renewable energy, from pneumatics to hydraulics, and even optics are considered by fischertechnik. Additionally, the kits can be expanded freely and the difficulty level can be adjusted incrementally.

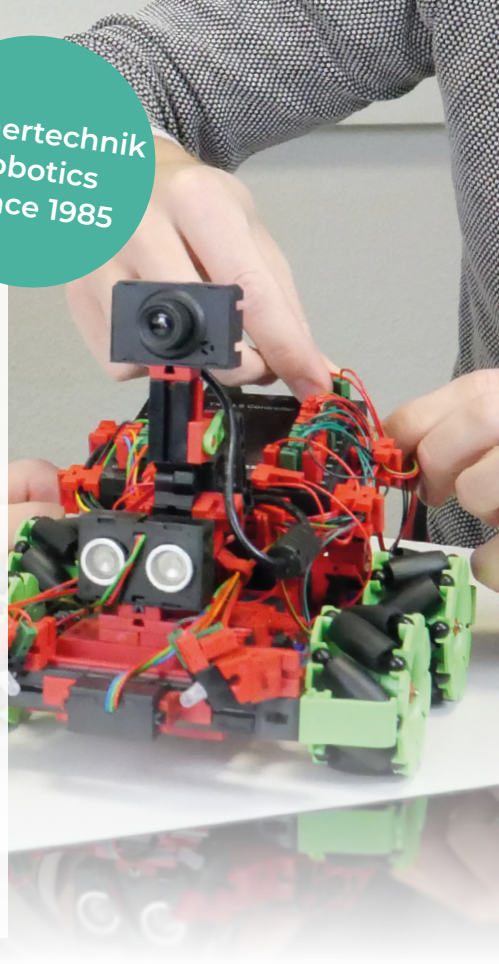
How do you use fischertechnik in your seminars?

Not a week goes by without me handling fischertechnik parts or using fischertechnik in seminars for a variety of purposes. Whether it's a physical experimental setup, a smartphone holder, or a customized stand, once the fundamentals are established with the fischertechnik system and the parts are used properly in the classroom, the concept can almost be considered a „self-runner." And this is exactly where the numerous advantages of the system arise: quickly, easily, and concretely, not only can diverse insights be gained, but there is also enough space for creative and self-determined action. This leads not only to individualized results but also to individual learning and discovery processes, which, in addition to positive experiences and enthusiasm – just to name two – are accompanied by many other positive effects.

Dr. Ralph Hansmann has written a guide for fischertechnik clubs at elementary schools (in German)

ROBOTICS & AI

fischertechnik Robotics - since 1985



Robotics and Artificial Intelligence (AI) are increasingly shaping society and the world of work, becoming a central component of general education. Early teaching of digital skills and „Computational Thinking“ prepares students optimally for the challenges of a digitalized world. Robotics offers a hands-on approach to computer science and fosters technical understanding, creativity, critical thinking, and problem-solving skills.

Integrating AI and robotics into the curriculum enables students to develop the ability to independently and collaboratively create innovative solutions. Studies show that these technologies not only enhance technological knowledge but also strengthen important social and cognitive skills. As a result, learners are better prepared for the opportunities and risks of the digital future.

Robotics and AI in the classroom combine practical application with interdisciplinary learning, laying a foundation for a creative engagement with modern technology.

PRESCHOOL & PRIMARY SCHOOL	PRIMARY SCHOOL	PRIMARY SCHOOL	SECONDARY SCHOOL	SECONDARY SCHOOL
LEARNING OBJECTIVES - Entry into the world of information technology and robotics - First graphic programming with pre-built programming blocks - Getting to know motors and sensors - Quick setup with minimal components for an easy start Built on Blockly	**LEARNING OBJECTIVES** - Create small programs - Learn the basics of robotics - Understand the meaning and function of sensors and actuators - Explore topics such as control, measurement and regulation - Collaborate in groups and assume roles Scratch Built on Blockly	**LEARNING OBJECTIVES** - Learn the basics of programming - Understand sensors and actuators - Develop problem-solving skills - Encourage creative thinking - Construct and engage in logical thinking OPEN ROBERTA Scratch Built on Blockly	**LEARNING OBJECTIVES** - Understand and recreate everyday technology - Build and expand computational thinking - Playfully discover STEM and Future Skills - Coding in Scratch, Blockly & Python Scratch python Built on Blockly	**LEARNING OBJECTIVES** - Graphical and text-based programming of complex robotics models including autonomous/ artificially intelligent robots - Control and evaluation of analog and digital sensors - Data transmission techniques - Coding and decoding processes - Image processing python Built on Blockly
 **First Coding**	 **STEM Coding Pro**	 **Starter Set Calliope / micro:bit**	 **STEM Coding Max**	 **TXT 4.0 + 6 Add Ons**

Robotics First Coding

Writing your own program, and thus bringing a robot to life, is incredibly exciting and thrilling! It is impossible to imagine today's world without this technology. To introduce even the youngest students to this exciting and important topic, our fischertechnik First Coding is the ideal choice. This introduction to computer science and robotics succeeds through the use of ready-made components, along with a whole lot of hands-on fun. The two motors and sensors are integrated in a ready-to-use block. That means: switch on, connect to the mobile device via Bluetooth and get started! The three models can not only be controlled via smartphone and tablet, but it is also child's play to create your own program with the First Coding app. The comprehensive teaching material, including three experiments with solutions, provides the perfect basis for teaching.

KEY AREA

- First steps in programming with the First Coding App

Incl. First Coding chassis consisting of 2x motor, 2x push button and infrared sensor, course, battery compartment for 3xAAA batteries (batteries not included) & Teach-In Function

Additional lesson and professional development support

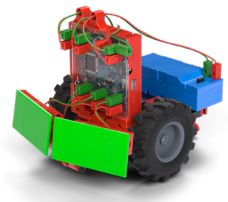
55 | 3 | 3

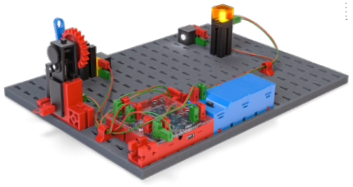
Item No.	560843
EAN	4048962429992
Dim. (mm)	320x80x230
Weight (g)	760

* works with First Coding App (required)

STEM Coding Pro

How do traffic lights work? How can I learn to program a simple drawing robot? On the basis of models taken from everyday life and tasks that build on each other, children learn key digital skills step by step. With the aid of a user-friendly controller, practical sensors and actuators, an intuitive Scratch app, models that are quick to set up and the colourful fischertechnik building blocks, primary school children solve tasks they are familiar with from their living environment. Thanks to the playful hands-on approach to learning, children also develop important social and emotional skills.





KEY AREAS

- Explore basics of computational thinking and robotics
- Learn to code with scratch and a user-friendly controller
- Understand how motors and sensors work
- Practice project and group work
- Develop emotional and social skills

Incl. 2x motor, 2x gears, 2x push button, 2x light barriers LED, photo transistor, NTC-resistor, USB-C accu & BT Smart Controller

Additional lesson and professional development support

147 | 36 | 12

Item No.	569025
EAN	4048962492811
Dim. (mm)	440x315x80
Weight (g)	1.780

Also available as NO BATTERY-version (item no. 574817)

* works with Coding Pro App (required)

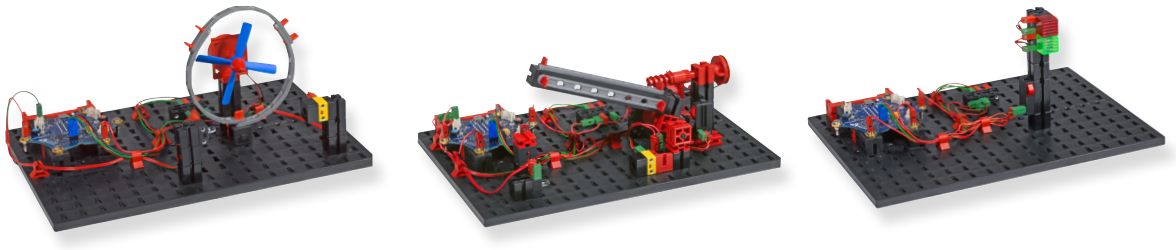
Built on Blockly

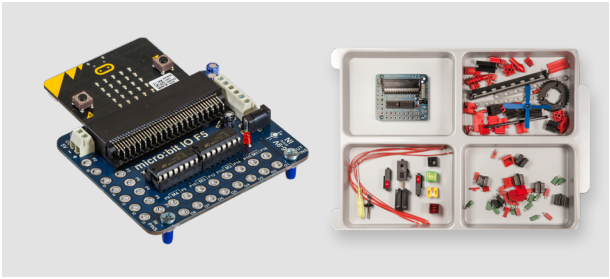
Starter Sets

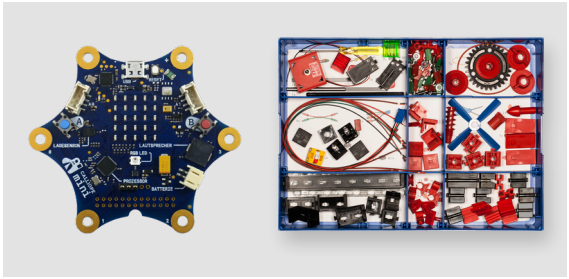
The fischertechnik starter sets for micro:bit or Calliope teach the principles of programming in an easy-to-understand way to students from the third grade upwards. Both sets include a fischertechnik parts assortment for building three stationary models. This allows simple, understandable demonstration models (pedestrian traffic lights, hand dryers or barriers) to be equipped with actuators and sensors and controlled via the micro:bit board or the Calliope board.

- Step by step instructions for getting started
- Various tasks and their solutions

Additional lesson and professional development support







for micro:bit

Fig.: iO F5 adapter with micro:bit
(8 outputs and 6 inputs;
micro:bit not included)

*** Required: micro:bit, software „Make Code“, Power supply**

Incl. micro:bit iO F5 adapter, XS motor, 2x light barrier LED, phototransistor, 2x push button & printed construction manual

90

3

Item No.	548884
EAN	4048962350944
Dim. (mm)	440x315x80
Weight (g)	1450

for Calliope

Fig.: Calliope Board
(not included)

*** Required: Calliope Board and software „Open Roberta”, Power supply: Via USB**

Incl. solar motor, 2x light barriers LED, phototransistor, 2x push buttons, printed construction manual & special mounts for the Calliope board

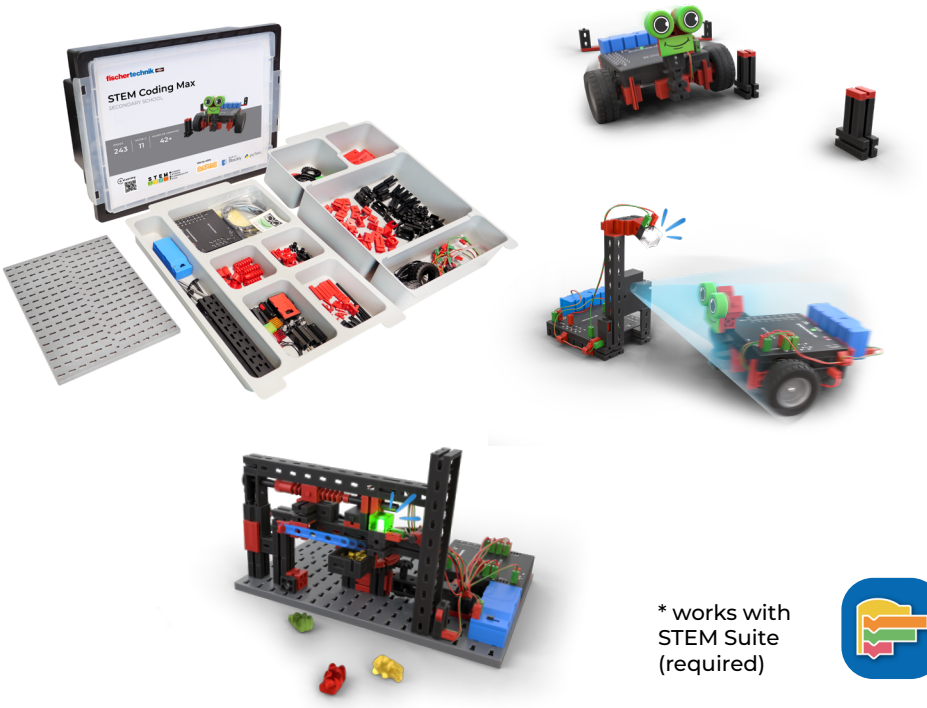
125

6

Item No.	544626
EAN	4048962316322
Dim. (mm)	270x195x40
Weight (g)	650

STEM Coding Max

In an independent way and guided by an app, students learn how to master everyday tasks, starting with simple basic tasks through to more complex circuitry challenges. With an easy-to-use controller, a range of practical sensors and actuators, an intuitive programming app and high-quality fischertechnik building blocks, they master tasks from their everyday world.



* works with STEM Suite (required)

LEARNING OBJECTIVES

Realizing everyday tasks in Information Technology and Robotics

Transferring conceptual models to everyday applications

Developing technical, methodological, personal, and social competencies

Learning program sequences and basic computational structures

Learning block- and textbased programming for an easy-to-use controller

Understanding and applying the functions and interconnections of actuators and sensors

Pre-vocational orientation in mathematical, scientific, technical, and/ or informational directions

42+ hours of teaching material:

Incl. RX Controller, color sensor, gesture sensor, proximity sensor, brightness sensor, magnetic switch, 2 motors, 3 LEDs, 4 buttons, USB-C 9V battery

For teachers: Free access to comprehensive teacher support materials incl. lesson plans and curriculum references available online / For students: Interactive tasks, tutorials, step-by-step building and coding instructions in fischertechnik app “STEM Suite” (available for free download for iOS, Android, Windows and macOS)

243

11+4

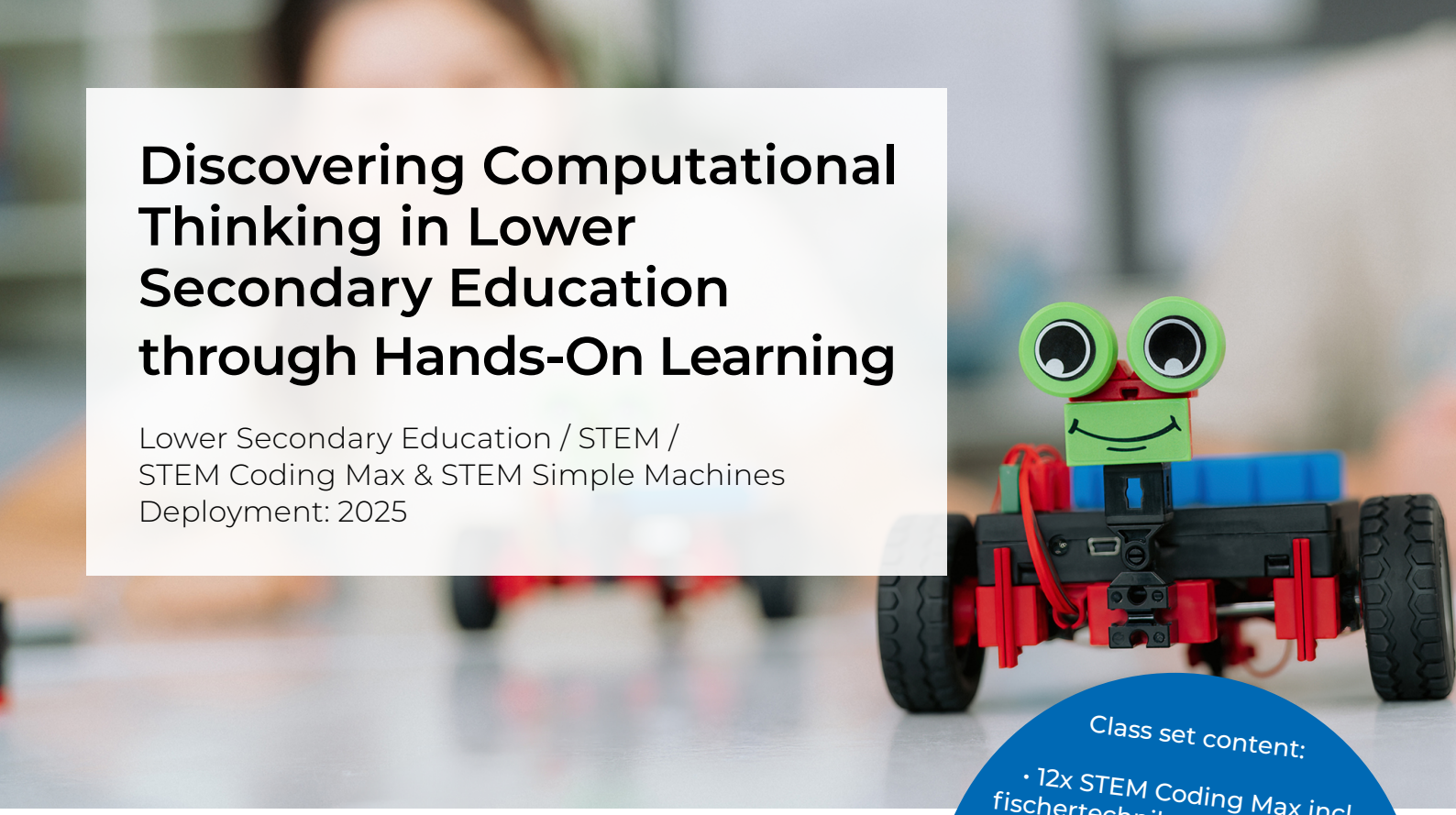
Also available as NO BATTERY-version (item no. 574721)

Item No.	571906
EAN	4048962516678
Dim. (mm)	440x315x150
Weight (g)	2.201

python™ Klett MEX Built on Blockly SCRATCH

Discovering Computational Thinking in Lower Secondary Education through Hands-On Learning

Lower Secondary Education / STEM /
STEM Coding Max & STEM Simple Machines
Deployment: 2025



Class set content:

- 12x STEM Coding Max incl. fischertechnik App "STEM Suite"
- 12x STEM Simple Machines
- 1x Creative Box with many fischertechnik elements
- Detailed lesson plans for educators
- Comprehensive teacher training provided by the LMZ Baden-Württemberg

The State Media Center (LMZ) Baden-Württemberg (Germany), on behalf of the Ministry of Education, will equip a total of 404 secondary schools with these ComThink class sets by the end of 2026.

Computational Thinking will establish itself as a fundamental way of thinking in education in the future. It provides educators and learners with innovative methods to systematically solve complex problems across various subjects. This, in turn, fosters learners' confidence and interest in digital technologies.

We chose fischertechnik because the realistic construction models with technical authenticity provide exactly what we need for our innovation project in the field of computational thinking. The hands-on models make it easy for learners to learn problem-solving strategies and think in complex systems, applying them directly to tangible, realistic models. This concept convinces us because it not only promotes understanding but also makes learning fun and strengthens learners' skills in a sustainable way.

Juanjuan Jia
Project Lead Computational Thinking
LMZ Baden-Württemberg

With the possibilities that fischertechnik offers, we have the freedom to make engineering tangible and experienceable during learning hours. The connection of mechanical, electrical, and digital challenges enables the development of solid foundational knowledge and promotes multifaceted problem-solving skills. Young people have the opportunity to develop practical solutions together and optimally utilize learning time for areas like technology, computer science, physics, art, and mathematics.

Silke Schick
Project Lead Computational Thinking
LMZ Baden-Württemberg

Robotics TXT 4.0 Base Set

The fischertechnik Robotics TXT 4.0 Base Set is the perfect start to programming like the pros! In addition to the camera with image processing, the extensive construction kit contains an ultrasonic sensor, two encoder motors, a track sensor, a phototransistor as well as two push buttons and two LEDs. The models can be programmed and controlled with the Robo Pro Coding programming software and the Robotics TXT 4.0 Controlller. Beginners can access ready-made sample programs, while advanced and professionals can get started directly in a Blockly programming environment or in Python. With an additional app (Android/ iOS), the TXT 4.0 Controlller can also be controlled via voice recognition. Included are 12 exciting models ranging from pedestrian traffic lights, a barrier, a barcode scanner to mobile driving robots with encoder motors, camera, lane and distance sensor.

KEY AREAS

- Robotics and programming (graphical and text-based)
- Actuators
- Analog and digital sensors
- Measurement
- Control
- Data transmission
- Coding-decoding
- Image processing

Incl. Robotics TXT 4.0 Controller, Robo Pro Coding Software, Accu Set, 2x Encoder Motor, USB Camera, Ultrasonic Sensor, Track Sensor, 2x Push Buttons, 2x LED & phototransistor

Additional lesson and professional development support

244 | 25 | 12

Item No.	559888
EAN	4048962424690
Dim. (mm)	440x315x150
Weight (g)	2850

Built on Blockly python™

Add Ons for Robotics TXT 4.0 Base Set

Building on this, the various add on expansion sets with specific high-tech themes such as autonomous driving, omniwheels and IoT (Internet of Things), the ideal expansion set for robotics competitions, artificial intelligence or industrial robots. Thus a painting robot becomes an autonomous car, or a soccer robot. Or a train barrier becomes a sensor station for measuring temperature, humidity, air pressure, air quality and brightness.

Autonomous Driving

Competition

Artifical Intelligence

Omniwheels

IoT

Industrial Robots

Add Ons for Robotics TXT 4.0 Base Set

Omniwheels

Build and program even more intriguing robots with the Add On: Omniwheels. Together with the Robotics TXT 4.0 Base Set, four exciting Omniwheels models can be constructed: Driving robots with different tasks, such as soccer robots, ball-throwing robots that recognize and knock down targets, and painting robot with pen that can be lowered and raised. The highlight of the kit are the Omniwheels, which are driven by four encoder motors (two of are included in the TXT 4.0 Base Set) and thus enable movement in any direction! The camera included in the TXT 4.0 Base Set enables image processing through which, for example, the soccer robot can recognize, follow and shoot a ball!

* Required:
Robotics TXT 4.0 Base Set

KEY AREAS
- Omniwheels vehicle control
- Object recognition
- Image processing
- Soccer robotics

Incl. 4x Mecanum Omniwheels, servo & 2x gear motor

Add On: Autonomous Driving

Additional lesson and professional development support

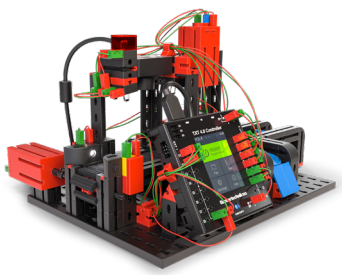
331 | 7 | 4

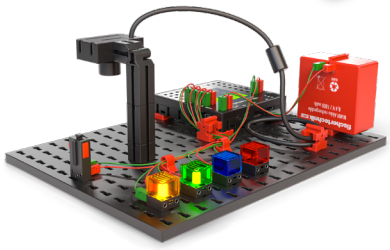
Item No.	559898
EAN	4048962424799
Dim. (mm)	320x230x80
Weight (g)	820

Built on Blockly python™

Artificial Intelligence

Artificial Intelligence is a key future technology. Our construction set promotes an early interest in this technology and prepares students for possible future vocational fields. They can immerse themselves in a playful way in the basic principles of AI and are given an insight into how AI technologies work. The set contains three models with different levels of difficulty. They illustrate the diversity of AI applications and offer a perfect introduction to this forward-looking technology. The scope of delivery includes instructional accompanying materials especially for use in the classroom, which deepen the understanding of Artificial Intelligence.





* Required:
Robotics TXT 4.0 Base Set

KEY AREAS
- Understand fundamentals of working with AI and machine learning
- Perform basic object detection
- Learn how to measure and evaluate model and classifier accuracy
- Experience the importance of high-quality training data for machine learning
- Discover how AI is used in real-life contexts

Incl. conveyor belt, work pieces, LED's & stickers

Additional lesson and professional development support

314 | 6 | 3

Item No.	569022
EAN	4048962492781
Dim. (mm)	320x230x80
Weight (g)	1613

Built on Blockly python™

Industrial Robots

This set allows learners to take an intensive look at the subject of industrial robots and to prepare themselves in a practical way to deal with the challenges of the modern world of work. Students assemble two realistic six-axle robot models and learn how to program these. This hands-on experience and the included didactic material enable learners not only to gain theoretical knowledge but to develop practical skills as well.

* Required:
Robotics TXT 4.0 Base Set

KEY AREAS

- Understand how modern industrial robots are structured and how they operate
- Learn how modern industrial robots are deployed in real production environments
- Practice coding use case examples

Incl. 3x servo joints with digital servos & work pieces

Additional lesson and professional development support

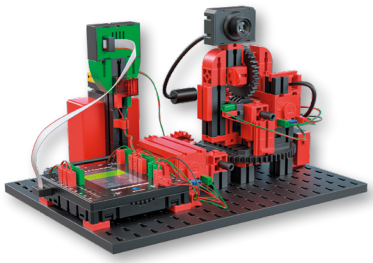
371 | 6 | 2

Item No.	564064
EAN	4048962458510
Dim. (mm)	320x230x80
Weight (g)	1516

Built on Blockly python

IoT (Internet of Things)

Professional entry into data acquisition. Together with the Robotics TXT 4.0 Base Set, the sensor station enables the measurement of temperature, humidity, air pressure, air quality and brightness. The sensor station can be programmed and controlled with the Robo Pro Coding programming software and the Robotics TXT 4.0 Controlller, and is ideal for teaching topics such as data acquisition and transmission as well as control and regulation of actuators and sensors. The data acquisition is carried out via the connection of the TXT 4.0 Controlller with the fischertechnik cloud, in which the sensor data is stored, collected and graphically displayed. Via the user interface, the so-called dashboard, the various sensor data are permanently recorded (in realtime) and the camera, which can be swiveled in two axes, is remotely controlled.



* Required:
Robotics TXT 4.0 Base Set

KEY AREAS

- Measurements
- Network connections
- Cloud-Computing

Incl. environmental sensor & brightness sensor

Power Set

Additional lesson and professional development support

72 | 6 | 1

Item No.	559897
EAN	4048962424782
Dim. (mm)	280x180x65
Weight (g)	450

Built on Blockly python

TXT 4.0 Controller

For details see p. 18

Item No.	560166
EAN	4048962426724

Autonomous Driving

Build and program your own “car of the future” to amaze and delight the classroom! The Robotics Add On: Autonomous Driving together with the Robotics TXT 4.0 Base Set offers the opportunity to explore and understand some of the exciting technological breakthroughs that are quickly becoming a part of our everyday lives. From automatic lights to a lane departure warning system, cruise control to automatic parking- this model guarantees enthusiastic eyes in the classroom. In addition to a differential, the construction kit contains more wheels, LEDs and a servo motor for steering. Add On: Autonomous Driving is rounded off by the teaching material, which contains 7 experiments with associated solutions.

*** Required: Robotics TXT 4.0 Base Set**

KEY AREAS

- Autonomous driving
- Control technology
- Analog sensor technology
- Speed measurement
- Distance calculation
- Distance measurement

Incl. chassis (differential, wheels), servo, LED & steering

Add On: Omniwheels & Competition

Additional lesson and professional development support

115 | 7 | 1

Item No.	559896
EAN	4048962424775
Dim. (mm)	280x180x65
Weight (g)	530

Built on Blockly python

Competition

The Robotics Add On: Competition is designed for schools, universities and other educational institutions that want to develop or improve their models for robotics competitions for their students. With this set, models can be enhanced and new features can be added, making this kit the perfect addition for competitions around the world. The set includes the new RGB gesture sensor, a combi sensor (gyroscope, acceleration and compass), an ultrasonic sensor, two more powerful motors, and track links and caterpillar pads for the undercarriage of a tracked robot - ideal for building competitive driving robots.

*** Required: Robotics TXT 4.0 Base Set**

Robotics in Competition

KEY AREAS

- Robot competitions
- Project work
- Workshops in robotics

Incl. RGB gesture sensor in 6 directions, color detection, ambient brightness, proximity detection up to 15cm, ultrasonic sensor, combi sensor (gyroscope, acceleration and compass), more powerful motors & snap-on track pads

Additional lesson and professional development support

240

Item No.	560842
EAN	4048962429985
Dim. (mm)	320x230x80
Weight (g)	600

Built on Blockly python

FISCHERTECHNIK

& OPEN ROBERTA

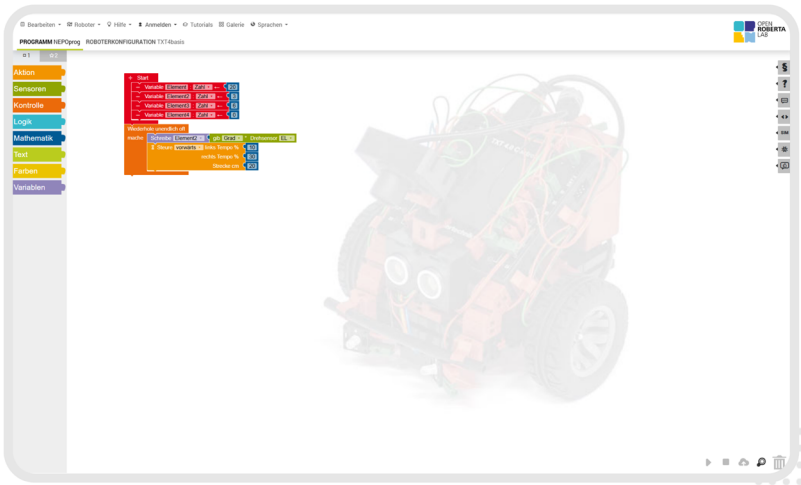
What is Open Roberta?

Open Roberta is a graphical programming platform that has been specially developed for use in education. It offers an easy-to-use environment for teaching students and teachers how to program robots and microcontrollers.

The fischertechnik TXT 4.0 Controller is available for programming, including neural networks, in the Fraunhofer Open Roberta Lab.

The fischertechnik TXT 4.0 Controller is fully integrated into Open Roberta, making it easier than ever to program and experiment with fischertechnik. In addition to navigating robots using block-based programming, users can now explore artificial intelligence and neural networks with the help of sensors. Educators benefit from a wide range of free, hands-on learning materials and tutorials in multiple languages, which can be easily adapted to their specific needs.

On the fischertechnik website, you can find more information as well as two detailed didactic modules that guide you step by step through programming neural networks using an ultrasonic sensor or a line follower. This powerful combination allows users to explore advanced programming concepts in a fun and interactive way - perfect for both beginners and experienced users.



Didactic step-by-step guide to exploring neural networks with the fischertechnik TXT 4.0 Controller available for free on the fischertechnik website.

ROBOTICS IN COMPETITION

STEM Coding RoboMission

MINT

Equipped with powerful encoder motors for robust drive and precise positioning, durable steel axes and adjustable gear stages, the robot can be fine-tuned for every requirement of the WRO categories RoboMission and Starter - whether it's speed or precision. The servo motor allows objects to be precisely targeted and moved - ideal for challenging obstacle courses.

WRO WORLD ROBOT OLYMPIAD™

(Exemplary model construction)

- Incl. TXT 4.0 Controller, RGB color sensor, 2 encoder motors, digital servo, 2 analog color sensors as track sensors, steel axles, battery & charger, many additional components for building a custom drive chassis, pre-assembled cables and a big and robust storage and transport box
- Helpful tutorials for an easy start on the fischertechnik website
- 375

Item No.	576109
EAN	4048962549331

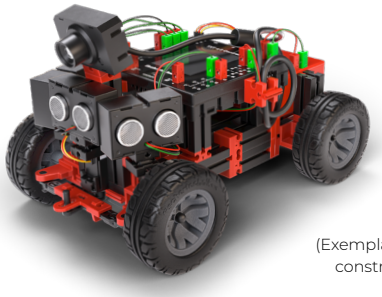
Built on Blockly python™

STEM Coding Competition

MINT

STEM Coding Competition comes with everything you need to build and program an autonomously driving robot car and to master an obstacle course successfully. The construction set for a customised chassis contains the powerful TXT 4.0 Controlller, three ultrasonic sensors, a powerful encoder motor, a camera, a differential gear, double-pivot steering including servo motor and a rechargeable battery and power adapter. The set is suitable for taking part in robotic competitions such as the Future Engineers category in the World Robot Olympiad.

WRO WORLD ROBOT OLYMPIAD™



(Exemplary model construction)

- Incl. TXT 4.0 Controlller, 3 ultrasonic sensor, powerful encoder motor, servo motor, Ackerman steering, differential gear, accu & charger, camera, kit for individual chassis
- Extensive accompanying materials and support for teachers
- 249

Item No.	571099
EAN	4048962510447

Built on Blockly python™

WORLD ROBOT OLYMPIAD ™

fischertechnik is an international Gold Partner of the World Robot Olympiad

Competitions are an exciting way for children and young people to develop their future skills. In the worldwide robotics competitions of the World Robot Olympiad, student teams aged 8 to 22 from over 90 countries participate. The teams choose one of the four competition categories, work together on a robotics/STEM challenge for the season, and then compete with other teams at local, national, and international events.

fischertechnik in WRO categories:

STEM Coding RoboMission Designed for RoboMission

Complete robotics construction kit with durable and powerful components for precision and strength on the RoboMission course.

ROBOMISSION

STEM Coding Competition Designed for Future Engineers

Complete robotics construction kit for a self-driving car, including control sensors, motors, and a differential gear.

FUTURE ENGINEERS

TXT 4.0 Controller & STEM Kits

Connect your own project with up to 9 controllers. Device communication via MQTT or fischertechnik cloud connectivity. Large machines can be built from multiple kits.

FUTURE INNOVATORS

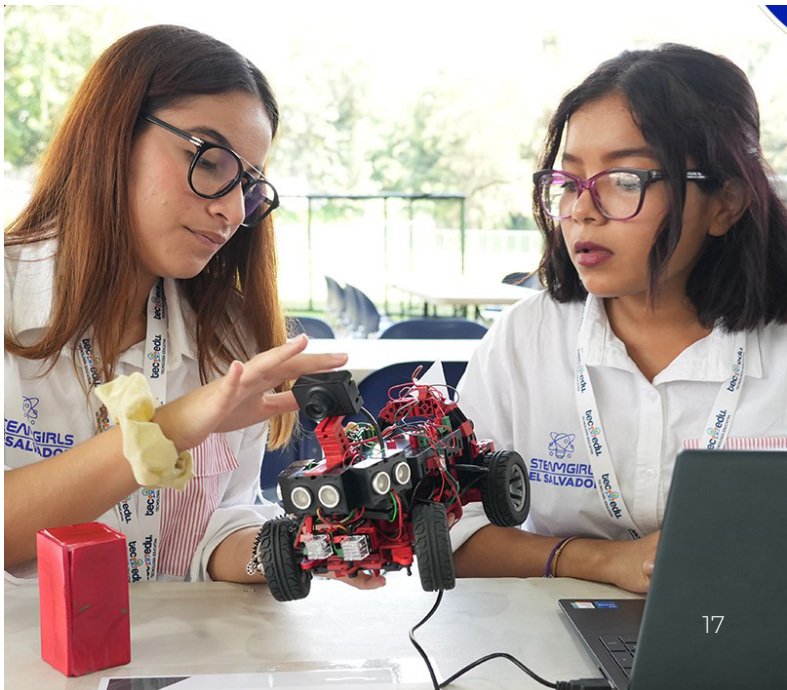
Compatibility with all fischertechnik motors and sensors

fischertechnik Shield for Arduino or HAT for Raspberry Pi, compatible with fischertechnik omniwheels and other components.

ROBOSPORTS

> What I enjoyed most about participating in the Future Engineers category was that we were able to solve problems through programming and work together as a team to find the best components for our solutions.
>
> I love that fischertechnik combines learning with fun - such as by mixing different prototypes and building our own machines from various components.

Alison Alemán (19 years, El Salvador)
Participant in the WRO
Future Engineers category



CONTROLLER & APPS

PRESCHOOL

First Coding

- Completely assembled with integrated control unit, 2 motors, track sensor, 2 push buttons, battery compartment
- Bluetooth 5.2 interface
- Attachment option for wheels

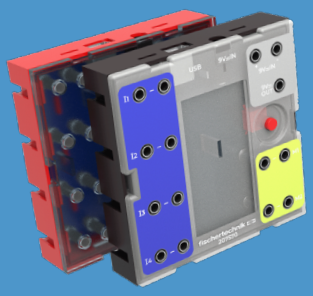
First Coding App

- Child-friendly, easy programming of the models via tablet/ smartphone
- Available for iOS and Android

PRIMARY SCHOOL

BT Smart Controller/ BT Controller

- 4 inputs for sensors
- 2 outputs for motors/ LEDs
- On/off switch
- Power supply



Coding Pro App

- Includes digital building instructions & teaching material
- for iOS, macOS, Windows and Android (free of charge in App Stores)
- Offline functionality
- Clear assignment of controller and end device with the app
- Programs can be named and saved locally
- Program examples included

LOWER SECONDARY

RX Controller

- 8 inputs for sensors
- 4 outputs for actuators (motors/ LEDs)
- 2x negative-, 1x positive output
- 2x interface for external I2C sensors (e.g. gesture sensor)
- 1x USB connection
- 1x on/off switch
- 1x Bluetooth switch

STEM Suite

- Multilingual programming environment
- Selection of different learning levels possible (beginner, advanced, expert)
- Storage locally or in cloud storage
- Interactive tasks
- Instructional videos & digital step-by-step building and programming instructions

or Robo Pro Coding software

HIGHER SECONDARY

TXT 4.0 Controller (see item 560166 / p.13)

- 8 universal inputs
- 4 motor outputs
- 4 fast counting inputs
- 3 servo outputs
- USB connection
- Bluetooth / Wifi Interface
- PC interface
- Camera interface
- Integrated loudspeaker
- Capacitive color touch screen
- Linux-based open source operating system

Software Robo Pro Coding

- Multilingual programming environment
- Selection of different learning levels possible (beginner, advanced, expert)
- Storage locally or in cloud storage
- Program examples included

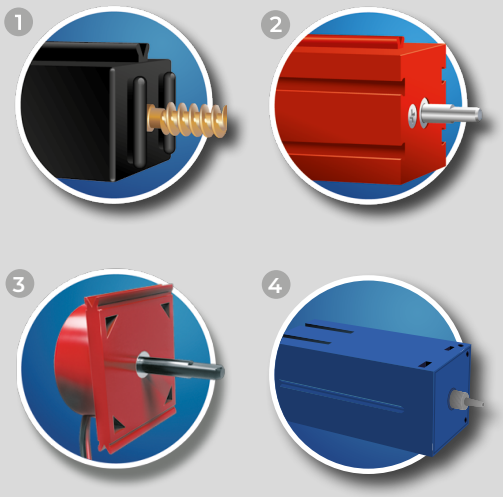
IMPORTANT COMPONENTS

Technical details

ACTUATORS

- Motors – generation of motion and propulsion of fischertechnik models:
  XS motor 1 (9VDC / 5995rpm / 1.52mNm / 265mA)
  S motor (9VDC / 9500 rpm / 4.8mNm / 650mA)
  S motor (24VDC / 10700rpm / 5mNm / 300mA)
  XM motor (9VDC / 338rpm / 84.15mNm / 950mA)
  Encoder motor 9V 2 (9VDC / 105rpm / 90mNm / 510mA)
  Encoder motor 24V (24VDC / 100rpm / 90 mNm / 190mA)
  Solar motor 3 (2VDC)
- Compressor 4 : Compressed air generation
  9V (9VDC / 0,7bar / 2l/min / 200mA)
  24V (24VDC / 0,7bar / 2l/min / 40mA)
- 3/2-way solenoid valve - control of pneumatic cylinders:
  12V (12VDC / 0.133A) / 24V (24VDC / 70mA)
- LED white (9VDC / 10mA) and Rainbow LED (9VDC / 10mA)
- Light barrier LED 9V (9VDC / 20mA)
- Light barrier LED 24V (24VDC / 16mA)

✓ARDUINO® ✓BBC MICRO: BIT ✓RASPBERRY PI®
www.fischertechnik.de/third-party-compatibility



SENSORS

- RGB color sensor: Color detection of the values red green blue, White with LED light source, (3.3VDC / I2C interface)
- Gesture sensor (RGB) in 6 directions: Color detection, ambient brightness, proximity detection up to 15cm (3.3VDC / I2C interface)
- USB color camera 1 (1MP): Color, motion, track and ball detection
- NTC resistor (1.5kΩ / 450mW): Temperature measurement
- IR lane sensor (2 outputs digital 9V): Lane detection
- Color sensor (signal: analog 0-9VDC): Color detection
- Ultrasonic distance sensor 2 (9VDC / distance 3cm-3m): Distance measurement
- Photoconductive cell (RSW551): Measuring brightness
- Push button (can be used as normally closed and normally open contact): Touch sensor
- Phototransistor for light barrier (up to 35V)
- Reed contact: Magnetic sensor
- Potentiometer (0-4,7kΩ): Rotary resistor
- Combi sensor 3 3 sensors in one component:
  Triaxial 16bit gyroscope, triaxial 12bit accelerometer, compass sensor, (3,3VDC / I2C-interface)
- Environmental sensor 4 : Measurement of temperature, air pressure, humidity, air quality, (3,3VDC / I2C-interface)

STEM-WORLD

Hands-on STEM learning concepts provide students with an interactive approach to scientific and technical subjects. Through experimental learning, physical, mathematical, and technical principles become tangible, making abstract concepts easier to understand. This practical approach also enhances motor skills and fosters creative problem-solving.

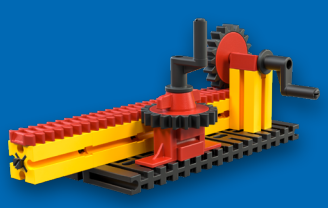
These concepts support collaborative work and motivate learners to engage with STEM topics in a playful way. They serve as an ideal complement to digital learning approaches and help develop essential skills for the future. With a well-structured didactic concept, they can be effectively integrated into lessons to achieve learning objectives sustainably and inspire enthusiasm for technology and science.

PRIMARY SCHOOL

MAIN TOPICS

- Statics
- Optics
- Simple machines
- Electronics
- Gears
- Solar energy

Available in class sets, consisting of 16 individual sets.



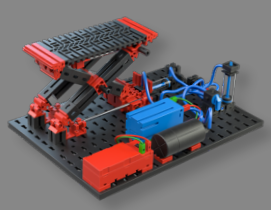
Class Set Gears

SECONDARY SCHOOL

MAIN TOPICS

- Physics
- Optics
- Electronics
- Pneumatics
- Mechanics
- Renewable Energies

Available in individual sets for 2 - 4 pupils each.



STEM Pneumatics

Renewable Energies

Regenerative or renewable energy refers to the provision of energy from sustainable sources such as the sun, wind, water, geothermal energy or biomass. They are available in almost inexhaustible quantities. In contrast, the supply of fossil fuels such as coal, oil, natural gas and conventional nuclear fuels is constantly decreasing as consumption continues. These fossil fuels are classified as non-renewable energies. Once they have been burned in a power or heating plant, they are no longer available. They do not regenerate, they are devalued.

The transition of the energy supply from fossil and nuclear fuels to renewable energies is already in full swing. In addition to the increased expansion of renewable energies, reducing our energy consumption and increasing energy efficiency through technological progress are both key issues and current challenges. In everyday life, we encounter the energy transition in electromobility in transport, when buying energy-efficient household appliances or when renovating buildings to make them more energy-efficient.

Primary School

Class Set Solar Energy

Renewable energies are becoming increasingly important. Our Class Set Solar Energy is the perfect introduction to the topic of solar energy for young students. With three quickly assembled models, the basics of solar energy can be taught in class using ten ready-made tasks, including solutions, with lots of fun and exciting insights.

KEY AREAS

- Energy generation from renewable solar energy
- Series-parallel connection

Incl. 2x solar module 1V, solar motor & push button

Additional lesson and professional development support

1184

10

3

Item No.	559894
EAN	4048962424751
Dim. (mm)	390x270x200
Weight (g)	7600

Secondary School

STEM Renewable Energies

How can you generate electricity in an environmentally friendly way? How does a fuel cell work and how can it be used to generate hydrogen? Renewable energies are the most important energy sources of the future. The generation, storage and use of electricity from the natural energy sources of water, wind and sun are clearly explained using different models. The powerful solar modules with their many attachment options open up flexible use in the models. The gold cap included serves as an energy storage device and can release the energy fed into the grid. The fuel cell illustrates how water is split into hydrogen and oxygen. In this way, the principle of future forms of energy is learned and important skills are trained.

KEY AREAS

- Extraction, storage and use of electric power
- Energy sources such as water, wind, sun and hydrogen

Incl. solar motor (2VDC), 2 solar modules (1VDC, 400 mA), gold cap energy storage, LED, fuel cell, voltage converter & multimeter

Additional lesson and professional development support

270

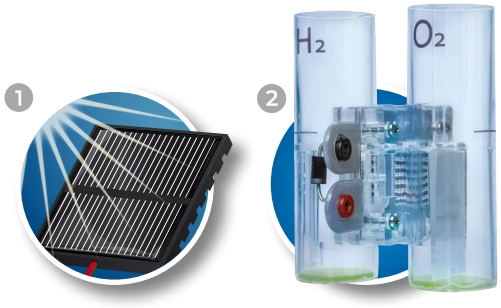
28

9

Item No.	559881
EAN	4048962424621
Dim. (mm)	440x315x150
Weight (g)	2700

„GREEN“ COMPONENTS

- Gold Cap (3.0V / 10F) - electrolytic capacitor for electrical energy storage
- Solar module 1 (1V / 400mA) - generation of electric current from solar energy
- Reversible fuel cell with integrated hydrogen storage 2
  Operation as electrolyzer (2-3V / 8ml/min / 400-1500mA)
  Operation as fuel cell (0.5-0.9V / 300mW / 600mA)

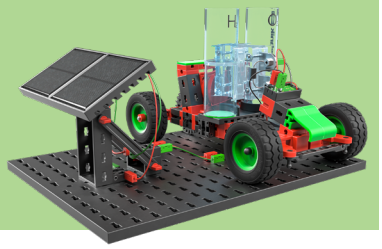


Renewable Energies

Use in class

Task examples

CHARGING STATION FUEL CELL / CHEMICAL ENERGY



TOPIC:

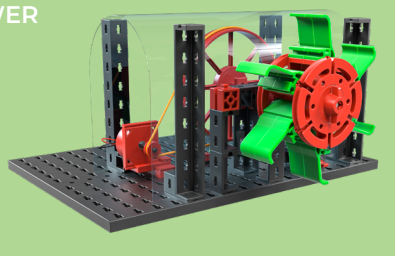
Conversion of chemical energy into electrical energy. If the hydrogen is obtained from renewable sources, the fuel cell can be counted as a renewable energy source.

LEARNING OBJECTIVES:

- Water electrolysis. Function and efficiency of a hydrogen fuel cell.
- The electrochemical reaction of cold combustion

and much more

WATER TURBINE / HYDROPOWER



TOPIC:

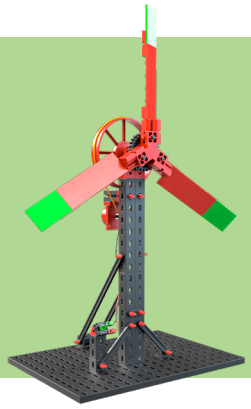
We examine hydropower using a model and learn about an alternative form of energy for energy generation in the context of renewable energies.

LEARNING OBJECTIVES:

- Types of power plants and energy storage of hydro power.
- Ecological aspects of the use of hydropower.

and much more

WIND TURBINE / WIND POWER



TOPIC:

We investigate wind power using 3 different models and learn about an alternative form of energy for energy generation in the context of renewable energies.

LEARNING OBJECTIVES:

- Calculating the potential of wind power.
- Handling measuring devices.
- Advantages and disadvan tages of wind energy.

and much more

Class Set Electrical Control

How does the light in the stairwell come on? Why does it go on at the bottom and off at the top? These and many other questions about electrical circuits are taught in an engaging and kid-friendly way using our Class Set Electrical Control with different models and experiments. The models can be easily built in class and directly integrated with the ready-made tasks and solutions.

KEY AREAS
- Electrical circuits
- Series-parallel connection
- Motor control

Incl. 2x push button, LED, motor, holder for 9V battery (battery not included)

Additional lesson and professional development support

544 | 25 | 9

Item No.	559893
EAN	4048962424744
Dim. (mm)	390x270x200
Weight (g)	6600

Class Set Gears

How does a bevel gear, a belt gear or a rack and pinion gear work? What happens when the transmission ratio changes? Young researchers can investigate these and many other questions using various models and experiments. The models can be set up quickly and easily in the classroom and can be used optimally with the help of the ready-made tasks and solutions.

KEY AREAS
- Simple gear types / ratios
- Directions of rotation
- Types of motion of gears

Incl. gears, bevel gears, rack, belt, chain, axles, building blocks & base plate 120x60 mm

STEM Gear Tech

Additional lesson and professional development support

1600 | 12 | 15

Item No.	559887
EAN	4048962424683
Dim. (mm)	390x270x200
Weight (g)	7100

Class Set Simple Machines

We encounter simple machines everywhere in our everyday lives. They help us to do work using as little effort as possible. The crowning glory of this construction kit is the relay machine that passes a ball back and forth. This is something the whole class can get involved in and combine the principles of what they have learned across the different modules with the fun of building and playing.

KEY AREAS

- Construction
- Transportation
- Joints and hinges
- Lever mechanisms
- Rope hoists and pulleys
- Rotary and linear motion
- Spring mechanisms
- Inclined plane

Incl. gear wheels and cable winch

Additional lesson and professional development support & class model „ball forwarding machine“ (built from all 16 sets)

2320

61

10

Item No.	564061
EAN	4048962458480
Dim. (mm)	405x280x400
Weight (g)	8140

Class Set Statics

How can a house survive a storm unscathed and why don‘t cranes fall over? The designers of tomorrow are exploring these questions and many others like these. They are exploring the stability and strength of technical structures and discovering the relationships between loadbearing capacity and connecting elements. Eight exciting models, in combination with the didactic material that comes with them, teach the subject of statics using bridges, cranes and truss constructions.

KEY AREAS

- Stability and strength in engineering structures
- Functional characteristics of structures
- Compressive and tensile forces
- System of triangular bracing

Incl. static components: Angle girders & struts

Additional lesson and professional development support & class model „Bridge“

3200

24

8

Item No.	564059
EAN	4048962458466
Dim. (mm)	405x280x400
Weight (g)	7660

Class Set Optics

Explore optical phenomena and experiment with light in class! Explore penumbra and umbra, discover many exciting things with a magnifying glass or determine the time with a sundial. These and many other exciting topics can be taught playfully in the classroom using the Class Set Optics. In addition to the models, which can be built quickly and are therefore easy to teach, the kit offers exciting experiments.

KEY AREAS

- Optical phenomena / light experiments
- Magnification
- Reflection
- Light & shadow

Incl. lens f=25mm, lens f=80mm, mirror, 2x LED & holder for 9V battery (battery not included)

Additional lesson and professional development support

1264

6

6

Item No.	559892
EAN	4048962424737
Dim. (mm)	390x270x200
Weight (g)	7.700

Class Set Basics

With this creative box especially for primary schools, students learn how to turn their imagination into creative models. Through the building ideas included, children quickly and easily construct their first playful models and explore them in role-play with the included figure.

KEY AREA

- Encourage creativity and eyes-hand coordination

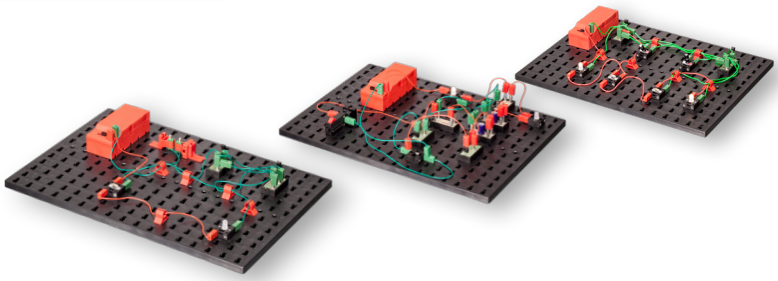
Additional lesson and professional development support

1440

Item No.	571104
EAN	4048962510461
Dim. (mm)	390x270x200
Weight (g)	7.314

STEM Electronics

Discover the exciting world of electronics with STEM Electronics! Through different models this construction kit teaches the basics and offers a variety of different electronics topics. From simple to complex models, such as an alternating flasher, many exciting functional models can be constructed with this construction kit. Teachers can find information material on the topic as well as ready-made tasks and solutions in the fischertechnik e-Learning Portal.



KEY AREAS

- Electrical circuits
- Resistors
- Measurement of current and voltage
- Principle of the electric motor
- Semiconductors
- Transistor circuits

Incl. XS motor, 2x push button, 2x diode, 2x transistor, 3x resistor, 2x capacitor & holder for 9V battery (battery not included)

Accu Set & Power Set

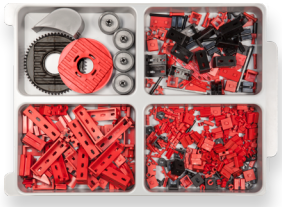
Additional lesson and professional development support

180 60 23

Item No.	559884
EAN	4048962424652
Dim. (mm)	440x315x80
Weight (g)	1.600

STEM Mechanics 2.0

This learning kit is ideal for future mechanical engineers, technicians or engineers: How does a cardan drive or a manual transmission work? What is a planetary gear? How do you construct a stable bridge? This learning kit answers these and other elementary questions from the subject areas of mechanics and statics using different models.



KEY AREAS

- Mechanics
- Statics
- Dynamics
- Effect of forces on bodies and objects

Incl. XS motor & battery holde

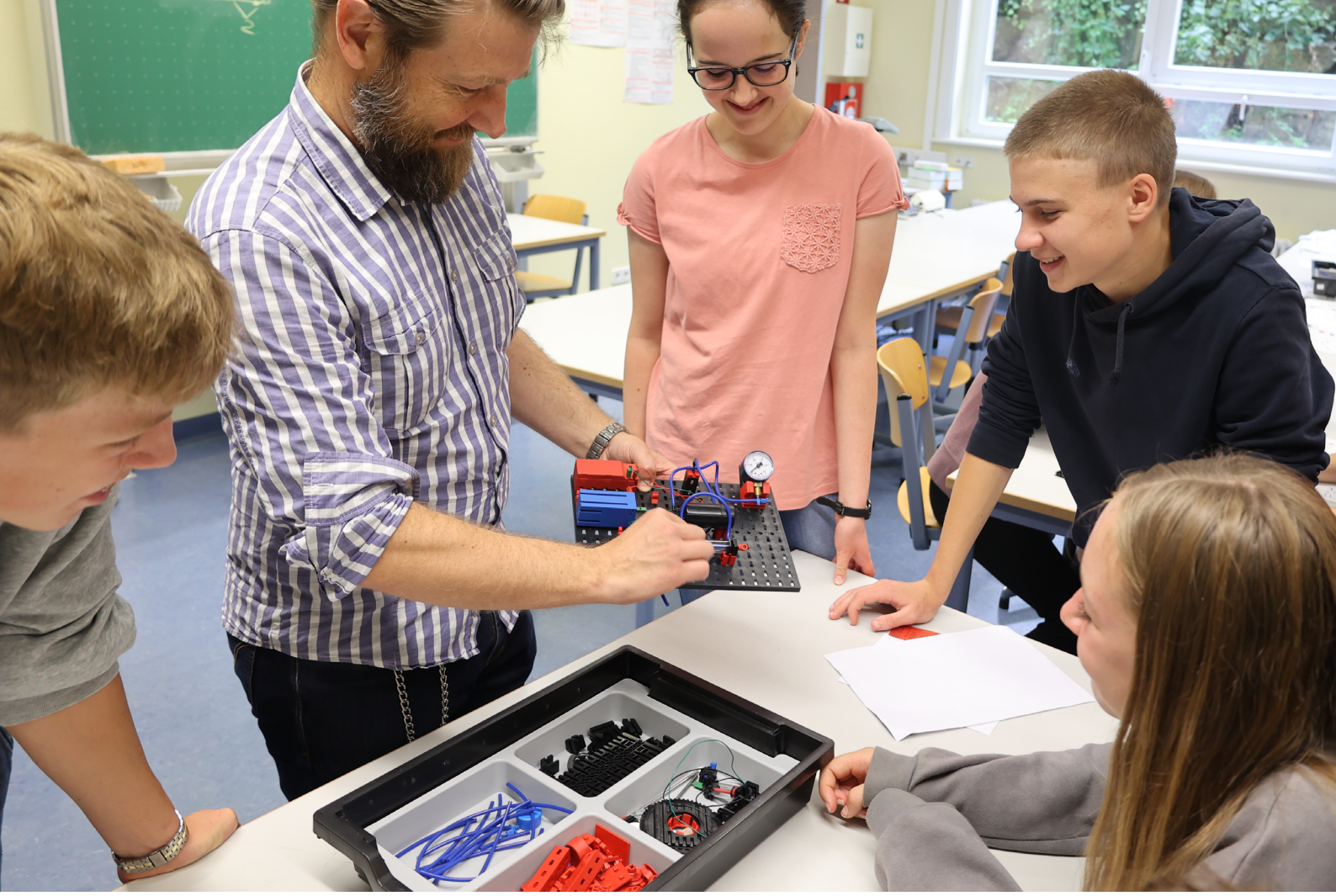
Accu Set

Additional lesson and professional development support

500

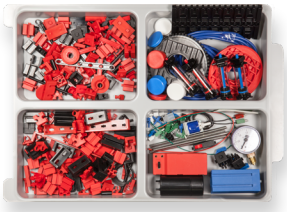
30

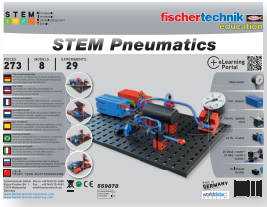
Item No.	538423
EAN	4048962263350
Dim. (mm)	440x315x150
Weight (g)	3.150

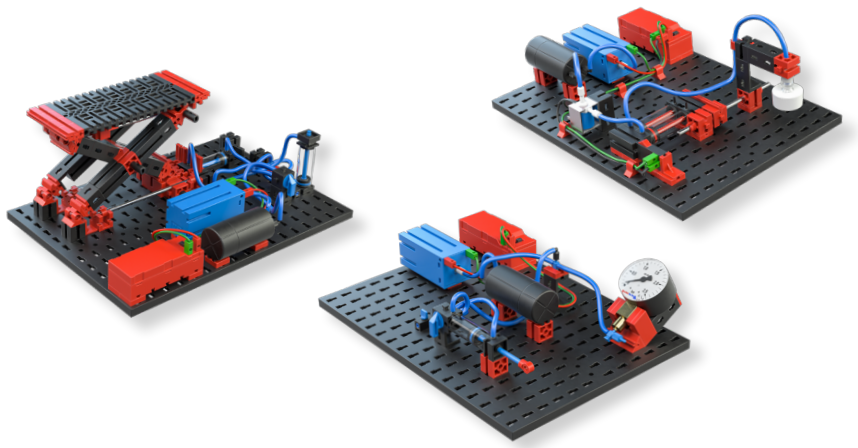


STEM Pneumatics

Pneumatics experimentation began as early as the third century BC, when the enormously versatile usability of compressed air was first discovered. STEM Pneumatics teaches the basics of pneumatics and demonstrates, for example, how a compressor, pneumatic valves and cylinders, and an exhaust air throttle valve work. The concept is rounded off by the extensive lesson plans for teachers.







KEY AREAS

- Generation and distribution of compressed air
- Control of pneumatic cylinders and many more

Incl. compressor, pressure gauge, 2x double-acting cylinders, 2x single-acting cylinders, compressed air accumulator, 2x manual valve, solenoid valve, push button, change-over check valve, vacuum cup, 2x exhaust air throttle & battery holder for 9V battery (battery not included)

Accu Set & Power Set

Additional lesson and professional development support

273 | 29 | 8

Item No.	559878
EAN	4048962424591
Dim. (mm)	440x315x80
Weight (g)	1.800

Acquire “future skills” in a fun way with pneumatics kits

Grade 9 / Subject: Technology / STEM Pneumatics / Application period 2024

The challenge

We at St. Johannes School are also undergoing a transformation process and must be ready for fundamental changes in order to enable children and young people to lead a sustainable life. At the same time, there is an acute shortage of skilled workers in the technical professions. Students need to be introduced to the basics of technology and IT in a fun way. Suitable teaching materials are needed to enable young people to develop creative solutions for technical tasks independently and as part of a team.

The solution

With the help of fischertechnik construction sets, numerous curricular requirements can be taught and learned in a hands-on way. The pneumatics sets provide a practical introduction to the basics of pneumatics and mechanical systems. The kits contain components such as compressed air cylinders, valves, hoses and other parts that make it possible to control movements or actions using compressed air. Students can create models in which compressed air is used, for example, to open or close flaps, move arms or perform other mechanical movements. The construction kits also promote an understanding of technical relationships and the development of problem-solving skills. They offer an exciting and varied opportunity to put theoretical knowledge into practice while encouraging creativity and technical thinking.

The result

The pneumatics sets from fischertechnik offer a variety of interactive opportunities for students to understand and apply curricular requirements. The knowledge and skills taught with the pneumatics kits can be used by young people in a variety of technical training courses in trade and industry. The technology lessons at St. Johannes School thus serve as an “appetizer” for technical professions.

The aim is to bring STEM subjects at the school into the modern age with attractive learning objects.

Robert Rother-Reinelt &
Axel Wernke-Stefan, Teachers

STEM Optics

Starting with basic concepts such as the magnifying glass and the paths beams take through different lenses, theSTEM Optics leads learners to more complex subjects, such as telescopes, spectrums, microscopes or projectors. Each model has been designed with great care and can be set up quickly thanks to the unchanging lens holder in connection with the optical bench, guaranteeing a smooth workflow in hands-on lessons.

KEY AREAS

- Explain optical principles
- Learn technical terms and articulate relationships between concepts
- Estimate, measure and compare
- Improve logical and strategic thinking
- Practice project and group work

Incl. 2 x lens f40, 1 x lens f103 & 1 x lens f-35

Additional lesson and professional development support

182 | 49 | 18

Item No.	569023
EAN	4048962492798
Dim. (mm)	440x315x80
Weight (g)	1.784

STEM Smart Physics

The world of construction and data analysis combined guarantees a practical and interactive learning experience in regular lessons. STEM Smart Physics contains ten exciting models, which make numerous physics experiments possible. From accelerated bodies through harmonic oscillations to the spreading and spectrums of sound – exciting tasks are waiting for learners, enabling them to test hypotheses and investigate physical laws in a practical way. The Phyphox app reads out the data collected in the smartphones that are integrated in the models and makes an immediate and detailed analysis of the measuring results possible. Thanks to the combination of theory and practice, learners gain a deep understanding of physical principles and develop their problem-solving expertise and analytical skills at the same time. The didactic accompanying material – especially developed for regular lessons – rounds the concept off and makes direct classroom use possible.

KEY AREAS

- Experiment with physical phenomena
- Apply physical principles
- Understand and articulate relationships between concepts
- Evaluate and analyse measurements
- Practice project and group work

Inkl. U-beam for fast and robust setups

Additional lesson and professional development support

107 | 18 | 10

Item No.	569024
EAN	4048962492804
Dim. (mm)	440x315x80
Weight (g)	1613

* works with Phyphox App (required)

MAKER KITS

Maker kits allow students to work creatively and apply technical knowledge in a practical way. They promote hands-on learning, strengthen problem-solving skills, and support the development of teamwork. Through independent crafting and experimenting, digital and technical competencies are expanded in a playful manner. These learning approaches spark enthusiasm for STEM topics and prepare learners for the challenges of a technology-driven future.

Maker Kit Omniwheels

The omniwheels on the basic model of this driving robot enable unique locomotion in any direction. The basic model is available as an example in the fischertechnik Design Studio.

AGE from 14 years

1

201

Encoder motors, 4 omni-wheels, steel axles, gearbox in front of each omniwheel, .stl data (3D print) available for brackets/ connections of common developer boards

Item No.	571901
EAN	4048962516623
Dim. (mm)	320x80x230

Maker Kit Car

The car chassis as a basic model not only provides a stable basis, but also enables individual adaptations and extensions. The basic model is available as an example in the fischertechnik Design Studio.

AGE from 14 years

1 119

Encoder motor, differential gear, steering knuckle incl. servo motor, .stl data (3D print) available for brackets/ connections of common developer boards

Item No.	571900
EAN	4048962516616
Dim. (mm)	320x80x230

Maker Kit Bionic

Walking robot chassis with servo motors, brackets and flat platform for your own superstructures The basic model is available as an example in the fischertechnik Design Studio.

AGE from 14 years

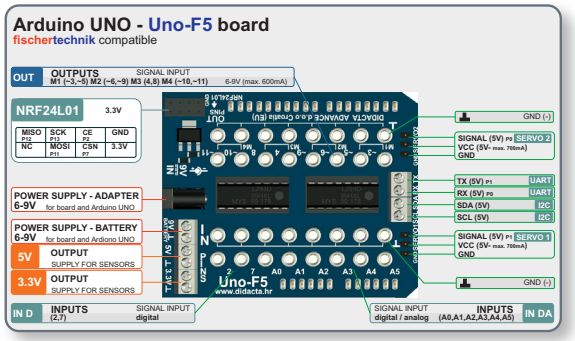
1 161

8 servo motors incl. fischertechnik brackets, .stl data (3D print) available for brackets/connections of common developer boards

Item No.	571902
EAN	4048962516630
Dim. (mm)	320x80x230

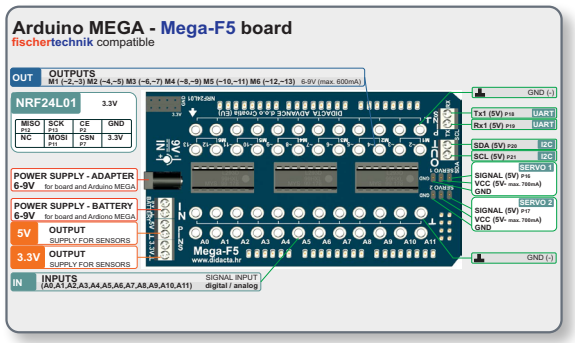
Arduino® & Raspberry Pi®

These fischertechnik adapters bridge the gap between the popular Arduino® UNO, Arduino® MEGA and Raspberry Pi® controllers and the versatile fischertechnik modular system Advanced users use the fischertechnik system to build complex mechanical models.



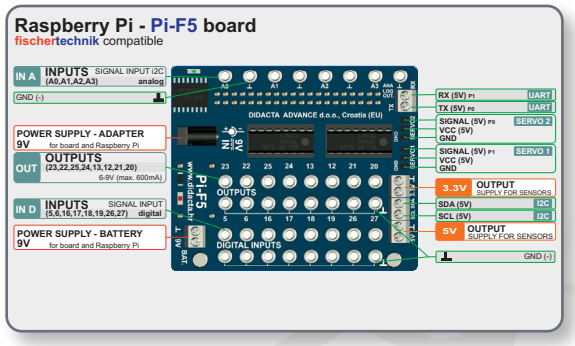
Arduino® UNO

Type	Item No.
Arduino® UNO	179450



Arduino® MEGA

Type	Item No.
Arduino® MEGA	179449



Raspberry Pi®

Type	Item No.
Raspberry Pi®	179448

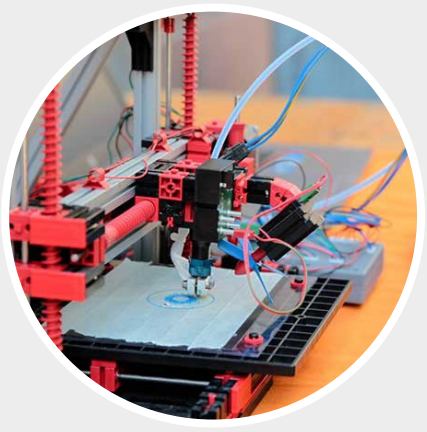
AFTER-SCHOOL PROGRAMS WITH FISCHERTECHNIK

fischertechnik learning concepts can be ideally integrated into regular classroom teaching with quickly buildable models and extensive teacher support materials. However, when the boundaries of the class period are lifted and there is more time for building, experimenting, and discovering, the full world of fischertechnik possibilities unfolds. In after-school programs or extracurricular activities such as technology or robotics clubs, courses in student research centers, or competition preparation, many children worldwide are already learning in a hands-on way, without time pressure, and playfully developing new skills while unleashing their creativity and imagination.

Technology clubs at technika in Karlsruhe, Germany

The Karlsruhe Technology Initiative „technika“ is a project initiated by the Karlsruhe IT Cluster CyberForum e.V. and Dirk Fox to promote the technical and IT knowledge of children and young people, and is now one of the largest STEM after-school initiatives in Germany. Its goal is to provide girls and boys with early and sustainable access to technical and computer science basics, spark their intrinsic interest in these areas, and convey a deeper understanding of our digital, technical world of today and tomorrow. Every week, 2,500 children and young people participate in fischertechnik clubs in and around Karlsruhe at 167 participating schools Dirk Fox is convinced that fischertechnik makes a valuable contribution to reducing the shortage of STEM professionals: „Like no other technical toy, fischertechnik imparts fundamental technical understanding while simultaneously inspiring enthusiasm for technical concepts.“

www.karlsruher-technik-initiative.de

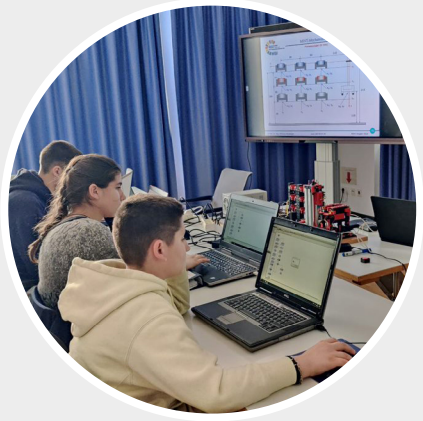


further
Success Stories

STEM and Robotics at the STEM Mechatronics Lab in Ostfildern, Germany

The WBI Forum e.V. association in Ostfildern has launched the educational project „STEM Mechatronics Lab.“ „With the fischertechnik sets, we already spark the interest of children and young people in STEM professions, as we can illustrate technical principles in a playful way,“ reports the chairman of the board, Prof. Nikolaus Neuberger. The educational project consists of six modules for different age groups, from elementary school through grades 5-6, 7-8, and 11-12. The modules aim to foster children‘s interest and enthusiasm for robotics, covering topics from practical electricity education and the basics of robotics to developing processes for a smart factory using the fischertechnik Learning Factory.

www.wbi-forum.de



Maker Clubs at the Student Research Center in Ulm, Germany

At the Student Research Center Ulm, there are special fischertechnik courses on the topic of „Maker“. Here, children and young people can learn how different tools and machines work and understand the types of gear systems behind them. Additionally, students build a remote-controlled robot using the new fischertechnik Maker Kit Car and a Raspberry Pi microcontroller for control. Students will learn command-line and Python programming on the Raspberry Pi.

Course instructor Falko Schmidt: „I chose fischertechnik because it enables functional models with just a few parts and offers the creative freedom we want to foster in the Student Research Center. High-quality, durable products ‚Made in Germany‘ are designed to spark joy in technology. This way, students can shape their future independently and creatively.“

www.sfz-bw.de/ulm

Renewable Energies at the Student Research Center (SFZ) in Tuttlingen, Germany

Alternative energies are ubiquitous for the generation of our elementary school students. They see wind turbines, photovoltaic systems, and hydroelectric power plants. But how do these systems work, and how can renewable energies be stored? These are the questions the Student Research Center (SFZ) South Württemberg in Tuttlingen plans to explore with different 3rd and 4th-grade classes in the new school year as part of the EU Horizon project. They have developed a workshop where children can build their own fischertechnik solar cars in one morning and learn about the principle of battery storage. “The fischertechnik kits combine two crucial aspects for us: first, the hands-on experience of building high-quality models, where students perform an important transfer task—translating the illustrated instructions into reality with their hands. Secondly, compared to many other construction kits, we were and continue to be impressed by the stable and well-developed functionality of the models, which effectively demonstrate, illustrate, and help understand the impact of solar energy.”

www.wbi-forum.de

CREATIVE BUILDING

Creative Box Basic

630

Equipped with many basic building blocks, angle brackets and other “basics”, this set is perfect for creating great things: It can be built freely, an existing theme can be reconstructed and an existing project can be further expanded. The large fischertechnik base plate is used as the basis for the models, which also functions as the lid of the sorting box. Supplied in a sturdy BOX 1000 with 8 sorting trays and flexible sorting bars.

Item No.	554195
EAN	4048962390490
Dim. (mm)	390x270x100
Weight (g)	2800

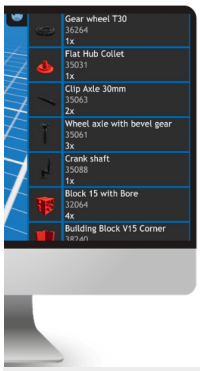
Creative Box Mechanics

290

Whether worm gear, chain drive, cable winch or other technical topics: With this box, they are very easy to recreate! The functionality can then be recognized and understood using the model, while the construction strengthens constructive thinking. The function and interaction of the fischertechnik building blocks included is explained in short form. The sorting boxes are closed by the fischertechnik base plate 500, which is ideal as a basis for creative building. Supplied in 2x sturdy BOX 500.

Item No.	554196
EAN	4048962390506
Dim. (mm)	270x195x80
Weight (g)	1050

ft Design Studio



Start online

Create and design your own models directly and design them online.

Create creative models

A large selection of individual parts can be easily placed as desired and simulate their functions.

Individual parts lists

Easily download the individual parts lists of the specially created models and order them via fischertechnik partners.

ADDITIONAL COMPONENTS

Box 1000

Ideal storage system for fischertechnik parts: Practical storage box with 8 sorting trays and 32 sorting bars. The lid is also the large building plate 390x270 mm.

Item No.	30383
EAN	4006209303832
Dim. (mm)	390x270x100
Weight (g)	1889

Accu Set

Microcontroller controlled charger that reliably protects against overcharging. Very short charging time, max. 2 h. Powerful NiMH Accu Pack with short circuit protection, 8.4V/1800 mAh.

Type	Item No.	EAN
220V	34969	4006209349694
120V	57487	4006209574874
240V UK	79833	4006209798331
220V AUS	52091	4006209520918

Dim. (mm)	225x150x65
Weight (g)	490

Power Set

Power supply unit and stepless power controller: The power supply from the socket for all fischertechnik models.

- Power supply unit performance data: Voltage 9VDC 2.5A
- Performance data Power Controller: adjustable output 1A max., additional output with 9VDC, 1A max. (not adjustable), both outputs short-circuit proof with overload protection

Type	Item No.	EAN
220V	505283	4048962069440
120V	91087	4006209910870

Dim. (mm)	225x150x65
Weight (g)	431

STEM Power Set 300

9V Li-Ion battery 340mAh, incl. USB-C charging cable

Item No.	574818
EAN	4048962538519
Weight (g)	57,5

Motor Set XS

Thanks to the compact dimensions, this motor can be installed almost anywhere. In addition to building blocks, gear parts, and gears, the set also includes a safety battery holder with integrated pole-changing switch for 9V battery (battery not included).

- Performance data: Voltage 9VDC, max. power 1.0W at 6000rpm

45

Item No.	505281
EAN	4048962069426
Dim. (mm)	225x150x65
Weight (g)	201

Motor Set XM

Powerful gear motor in compact plastic housing with numerous attachment options. With many gears, axles and gear parts.

- Performance data:
  Voltage 9VDC, max. power 3.0W, approx. 340rpm

40

Item No.	505282
EAN	4048962069433
Dim. (mm)	225x150x65
Weight (g)	278

*** Required: Accu Set or Power Set**

Control Set

The Control Set lets fischertechnik models be controlled remotely via the Bluetooth Control App, using a smartphone or tablet. The Bluetooth Low Energy technology offers a long range of up to 10 meters. The receiver has three motor outputs and a servo output, which enables smooth steering and continuous speed regulation. The set comes with one servo. The app can be used to operate up to two receivers, which allows for a large number of use cases.

Item No.	563931
EAN	4048962457438
Dim. (mm)	225x65x150
Weight (g)	273

HIGHER EDUCATION

In vocational training and industry, fischertechnik training models are the ideal tool for realistically simulating complex production systems on a compact scale. With our training models, you can create sustainable learning experiences in vocational training and studies and conduct research into the future topics of production and automation.

Our continuum includes training models for Industry 4.0, Agile Production, AI, PLC programming and virtual commissioning.

Optimizing neural networks in production control at the University of Potsdam / Brandenburg, Germany

Area of research / application: Expansion of research into the application of artificial intelligence in production control. By conducting the designed experiments, the effects of inefficient knowledge flows under ANN-based systems of Industry 4.0 can be systematically investigated. This enables not only the identification of weak points, but also the development of targeted strategies to optimize knowledge flows and improve overall productivity.

The 24V Training Factory with Siemens S7-1500 PLC for vocational training at the Technical University of Moldova in Chisinau

Research / application area: Training Factory as part of the “Industry 4.0 - Integrated Control Systems” laboratory at the Faculty of Mechanical Engineering and Transport. The fischertechnik learning factory serves as a research and teaching simulation environment to improve and understand the Industry 4.0 concept, including the various communication protocols. In combination with the learning environment, the fischertechnik cloud and the 12 workstations installed in the laboratory, a comprehensive teaching and learning environment is created to train the “engineer of the future” through “innovation in education”.

fischertechnik

www.fischertechnikwebshop.com

MADE IN GERMANY

Icons

- Listed components included
- Additional lesson and professional development support
- Ideal accessories
- Number of parts
- Number of experiments
- Number of models

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