

# Powered by LEGO® MINDSTORMS® Education

With LEGO® MINDSTORMS® Education the greatest challenge you'll have is getting your students to leave the classroom!

LEGO MINDSTORMS Education EV3 engages students in computer science, science, technology, engineering and math. You can be up and running in less than 45 minutes, fully supported by 48 step-by-step tutorials and a guide to all the programming language and hardware functions.

LEGO MINDSTORMS Education has been around since the late 1990s and is renowned for enabling students to solve authentic design and engineering problems in countless different ways.

So ignite student's engagement and energize learning through real-life problem solving with LEGO MINDSTORMS Education EV3.

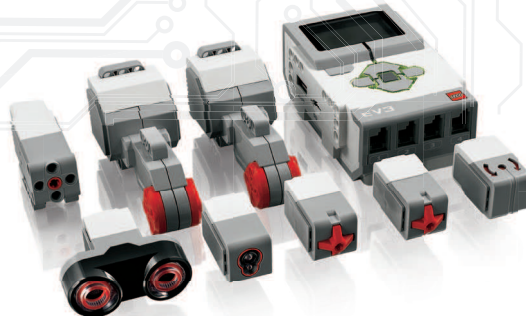
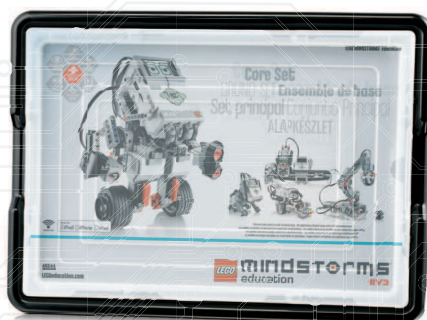




## LME EV3 Core Set

45544 1-3 541 www 10-21 yrs

**Replacement  
Packs Available**  
See page 83



This core set is optimized for classroom use and contains all you need to teach using the exciting LEGO® MINDSTORMS® Education EV3 set. It enables students to build, program and test their solutions based on real life robotics technology. It contains the EV3 Intelligent Brick, a powerful small computer that makes it possible to control motors and collect sensor feedback. It also enables BT and Wi-Fi communication as well as providing programming and data logging. Students are encouraged to brainstorm in order to find creative solutions to problems and then develop them through a process of selecting, building, testing and evaluating them. This is also an excellent way of getting students to talk to each other and cooperate as well as giving them hands on experience with an array of sensors, motors and intelligent units. Instructions for additional models are included in the software. The set also comes in a sturdy storage box with a sorting tray for easy classroom use and storage. The software and battery charger are sold separately.

The set includes:

- Three interactive servo motors
- Built-in rotation sensor and ultrasonic sensor
- Color/light sensor, gyro sensor and two touch sensors
- Rechargeable battery
- Ball wheel
- Connecting cables
- Building instructions
- LEGO® Technic building bricks for creating a vast variety of models

### Key learning values

- Design and build programmable robots using motors, sensors, gears, wheels, axles, and other technical components
- Understand and interpret two-dimensional drawings to create three-dimensional models
- Build, test, troubleshoot and revise designs to improve robot performance
- Gain practical, hands-on experience using mathematical concepts such as estimating and measuring distance, time, speed
- Communicate effectively using scientific and technical language

## LME EV3 Expansion Set

45560 1-3 853 www 10-21 yrs

This set contains a wide range of elements and is an ideal supplement to the EV3 Core Set. It has been designed to allow students to take their experience of robotics to the next level. There are plenty of special elements here, such as different gears, a large turntable, robot personalization parts and unique structural elements. These are joined by many extra standard elements like beams, axles and connectors. This set both helps students build larger and more complex models while at the same time providing extra or replacement elements. The set is optimized for use in the classroom and after school programs or robotics competitions. It will be delivered in a sturdy and stackable plastic storage bin. You can download additional building instructions and programs for several models from [LEGOeducation.com/MINDSTORMS](http://LEGOeducation.com/MINDSTORMS).

**Replacement  
Packs Available**  
See page 83



# LEGO® MINDSTORMS® Education EV3 Software

This powerful, easy to learn, easy to use software for programming and data logging is based on National Instruments LabVIEW™. This is the industry-leading graphical system design software used by scientists and engineers worldwide. It is optimized for classroom use and follows the very latest developments in intuitive software design and gives is really student-friendly.

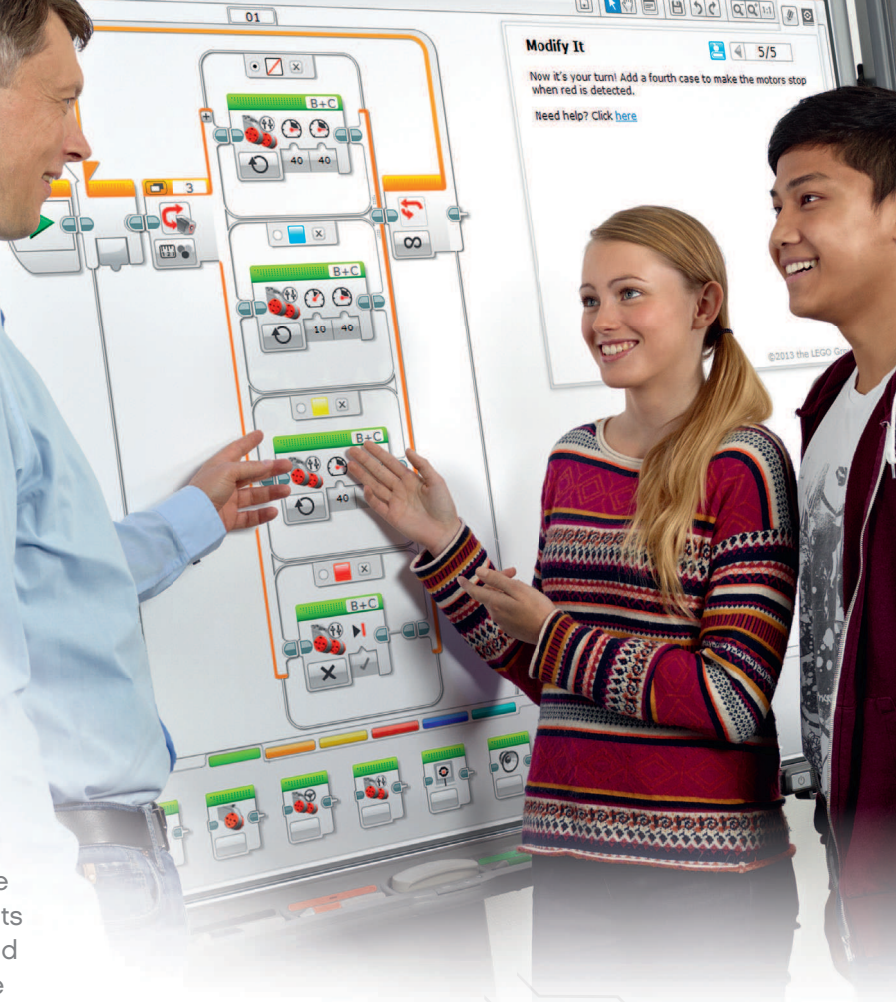
Programming with the EV3 Software is done by dragging and dropping icons into a line in order to form commands. The language's graphical interface lets students build simple programs, and then easily and intuitively build on their skills until they are developing complex algorithms.

The software's data logging feature is a powerful science tool for carrying out experiments. It is easy to collect, view, analyze and manipulate data from sensors and see the data in interactive graphs. Its unique feature, known as graph programming, makes experiments come alive as students can set threshold values for sensors, such as making a sound when a certain temperature is detected by the sensor.

The built-in content editor enables teachers to customize the curriculum and create their own lessons. It enables students to capture their work directly inside the content creating their own digital workbook, making classroom management and assessment easier.

The software comes with the robot educator learning tool that summarizes what the LEGO® MINDSTORMS® Education EV3 software is about. It includes 48 step-by-step multimedia tutorials designed to help educators and students master basic and advanced programming as well as hardware and data logging functions. Just add the core set and you're ready to go!

See overleaf for more information on the different license types.





## LME EV3 Software Single License

2000045   10-21 yrs

The single license version of the EV3 Software allows you to install and run the software on one computer at a time.

## LME EV3 Software Site License

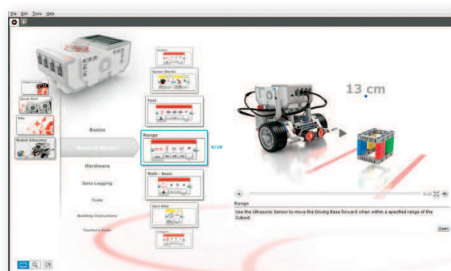
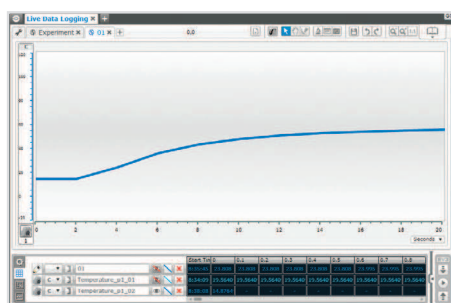
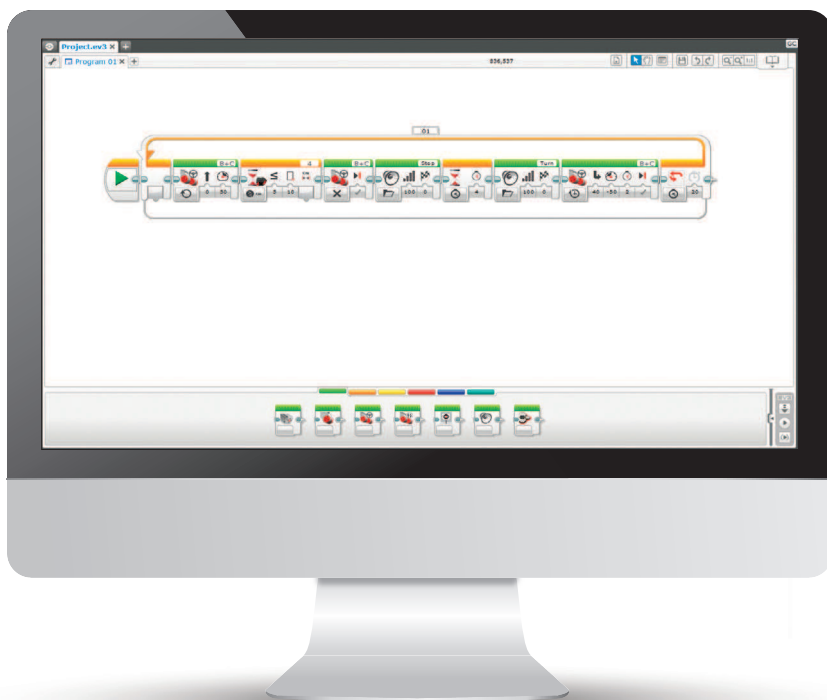
2000046   10-21 yrs

The site license version of the EV3 Software allows you to use the Software on one or more compatible computers in the same Site License-purchasing institution. Should the purchasing institution have more than one branch, each branch must purchase a separate Site License.

## LME EV3 Software Network License

2000049   10-21 yrs

This product allows the use of the EV3 Software on computers in up to twenty pre-agreed and named institutions in the purchasing network.

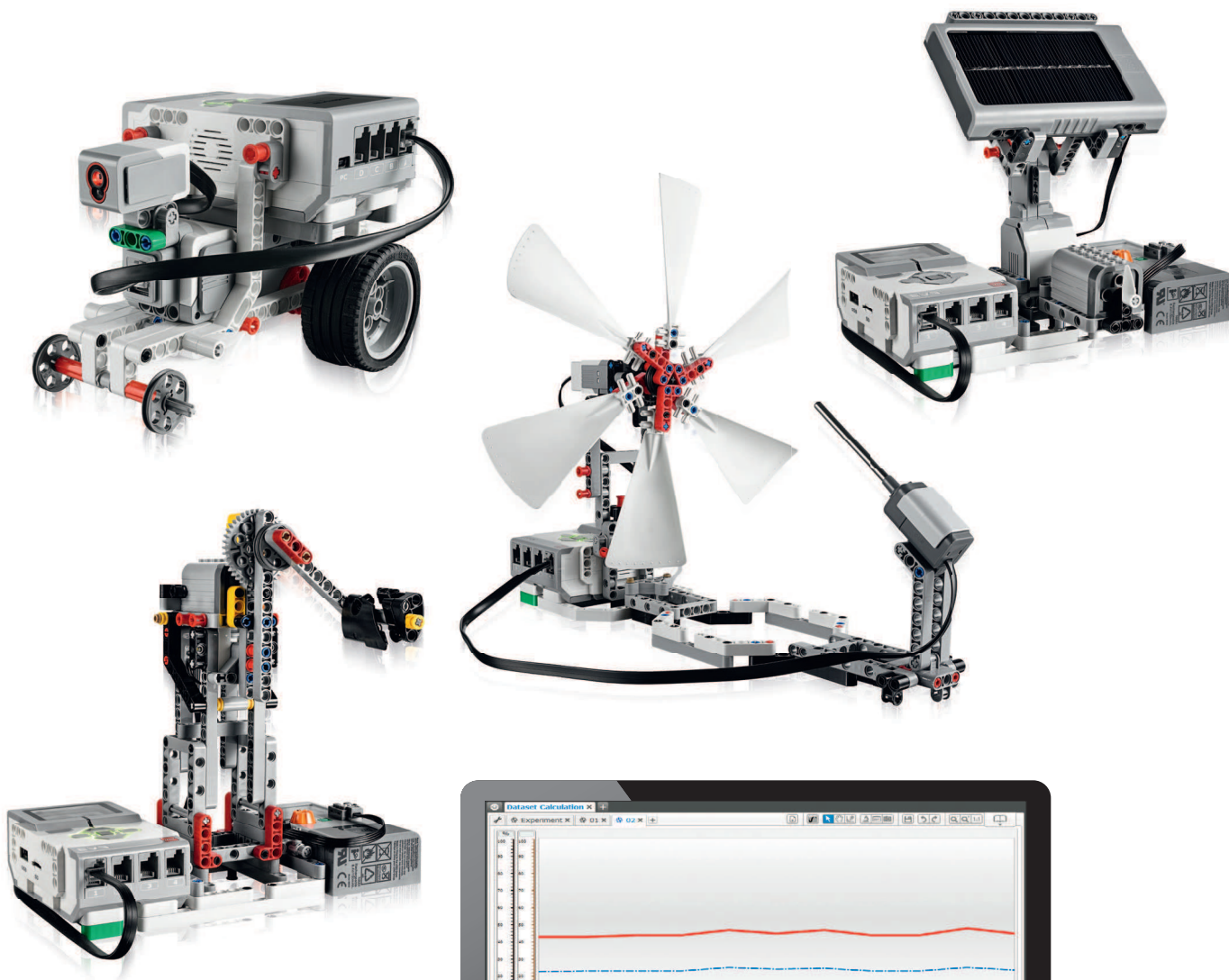


### Key learning values

- Using input and output devices and producing a simple set of sequential instructions linking cause and effect
- Developing and testing a system to monitor and control events
- Using intuitive prediction tools to get firsthand experience with making hypothesis
- Using the scientific inquiry process when gathering and analyzing data sets
- Integrating Math and Science using physical constants, units of measurement, coordinate systems, min, max, mean and linear formulas

The built-in content editor enables teachers to customize the curriculum and create their own lessons.





## LME EV3 Science Activity Pack

2005576 [www](http://www.lego.com) 10-21 yrs

Developed together with Fraunhofer, Europe's largest application-oriented research organization, in close collaboration with Science teachers, this activity pack consists of 14 experiments within the Physical Science curriculum area utilizing the data logging capabilities of the LME EV3 hardware and software. More specifically, the experiments are centered on Renewable Energy (energy production and consumption), Thermal Physics (boiling/melting points and heat transmission), Mechanics (forces and motions) and Light (light intensity). Each experiment is structured to fit within a 45-90min Science lesson with small but engaging LEGO® models that do not require a lot of time for building and programming. Please note, this pack requires the temperature sensor and the energy set.



### Key learning values

- Asking questions, developing, and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics, informational and computer technology, and computational thinking
- Constructing explanations and designing solutions
- Obtaining, evaluating, and communicating information







## LME EV3 Space Challenge Set

45570 1-6 1418 www 10-21 yrs

This theme-based set guides students through LEGO® MINDSTORMS® Education EV3 building and programming and makes a great introduction to the exciting world of robotics. It contains three learning mats, a Challenge mat, dual lock tape and lots of elements needed in the Challenge models. The set will show your class how robotics can be applied to a range of real-world applications and get them working together to solve realistic problems described in the Learning Missions part of the 2005570 Space Challenge Activity Pack. Have your class apply skills from the STEM subjects as they build, test and then see how effective their models are. These can also be found in the 2005570 Space Challenge Activity Pack. The Space Challenge Set requires 45544, 2005570 and 2000046.

**Replacement  
Pack Available**  
See page 83



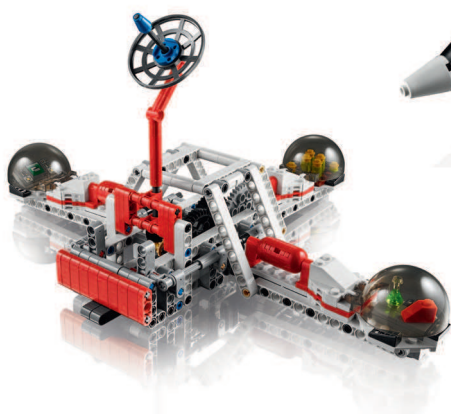
## Key learning values

- Easy start with robotics
- Apply robotics to real-world applications
- Involvement in problem-solving
- Teamwork skills
- Hands-on engagement with STEM subjects
- Develop solutions
- Build, test and evaluate
- Experience of programming, sensors, motors and intelligent units

## LME EV3 Space Challenge Activity Pack

2005574 www 10-21 yrs

This series of classroom-tested and easily-implemented lessons will help you teach STEM concepts. The Space Challenge enables students to take responsibility for their own learning. They will work as young scientists and engineers, immersing themselves in motivating STEM activities that prompt creative problem-solving, communication and teamwork.



Models shown above are examples of what can be built with this set.



# LME EV3 Design Engineering Projects

2005544 [www](http://www.lego.com) 10-21 yrs

New from LEGO® Education for the EV3 platform is Design Engineering Projects, a curriculum package with 30 hours of classroom instruction and open-ended problem-solving activities that make learning of science, technology, engineering and mathematics through real-life robotics engaging and fun for students.

## Key learning values

- Learn and use engineering design process skills
- Understand and use mathematical skills and concepts, such as proportions and ratios, graphing data and multi-digit computation
- Apply knowledge of science concepts, such as speed and power, motion and stability, and forces and interactions
- Understand cross-cutting concepts, such as systems, patterns, structure and function, and logical thinking
- Understand the core concepts of technology
- Understand the role of troubleshooting, invention and innovation, and experimentation in problem solving
- Plan and manage activities to develop a solution or complete a project
- Demonstrate creative thinking and construct knowledge using technology
- Use digital media and environments to communicate and work collaboratively

The curriculum features three main sections with five design projects per section for a total of 15 projects:

- **Make it Move:** Students are challenged to design, build and program robots that move using motors with rotation sensors. In five projects, students apply mathematics and science knowledge to create robots that measure distance, measure speed, move without using wheels, maximize power to move up an incline, and move and turn to create regular polygons. Students will also apply their knowledge of simple and complex machines and use ratios to describe proportional relationships.
- **Make it Smarter:** Students are challenged to add sensors to their robots to control behavior and to measure, graph and analyze sensor data. In five projects, students develop robots that use sensors that measure ambient and reflected light, distinguish specific colors, measure distance from an object, recognize a touch sensor state (pressed or not pressed, or pressed and released), and measure angular displacement or rate of change.
- **Make a System:** Students are challenged to design, build, and program robotics systems built from subsystems. In five projects, students develop systems that move a ball, pick and place objects, simulate manufacturing, sort colors, and communicate their location. Students test their system, gather data, and use that evidence to engineer system optimizations and improvements.

The structure of the activities in the Design Engineering Projects curriculum mimics the engineering design process used by scientists and engineers in many industries. Each project starts with a design brief explaining the challenge, uses videos of robots in action to make real-world connections, and culminates in a final project that can be shared and presented. Throughout the process students gain and use knowledge of science, technology and mathematics as they engineer a solution. This structure is designed to help students develop the 21st-century creative thinking, problem solving, teamwork, and communication skills required for success in school and beyond.

The curriculum is digitally-delivered and installs directly into the LEGO® MINDSTORMS® Education EV3 programming software lobby. The in-built content editor enables teachers to customize the curriculum and create their own lessons. It enables students to capture their work directly inside the content creating their own digital workbook, making classroom management and assessment easier.

The Design Engineering Projects curriculum was written to match national curriculum. For full curriculum grid including correlation to standards and activity examples please visit [legoeducation.com/MINDSTORMS](http://legoeducation.com/MINDSTORMS)





## Transformer 10V DC

45517  1 [www](http://www.lego.com) 8+ yrs

This standard 10V DC transformer allows you to recharge your 9693 Rechargeable Battery DC or 8878 Power Functions Rechargeable Battery Box.



## Temperature Sensor

9749  1 [www](http://www.lego.com) 8+ yrs

The temperature sensor is a digital sensor powered by the NXT brick. Using the NXT brick and NXT software version 2.0, it can be calibrated to measure both Celsius and Fahrenheit (-20 °C to +120 °C/-4 °F to +248 °F).



## EV3 Intelligent Brick

45500  1 [www](http://www.lego.com) 10-21 yrs

This programmable, intelligent brick serves as the heart and brain of LEGO® MINDSTORMS® Education EV3 robots. It features an illuminated six-button interface that changes color to indicate the brick's active state, a high-resolution black and white display, built-in speaker, USB port, a mini SD card reader, four input ports and four output ports. The brick also supports USB, Bluetooth and WiFi communication with a computer and has a programming interface that enables programming and data logging directly onto the brick. It is compatible with mobile devices and is powered by AA batteries or the EV3 Rechargeable DC Battery. The brick features:

- ARM 9 processor with Linux-based operating system
- Four input ports for data acquisition of up to 1000 samples per/sec
- Four output ports for execution of commands
- On-board program storage including 16 MB of Flash memory and 64 MB of RAM
- Mini SDHC card reader for 32 GB of expanded memory
- Illuminated, three-color, six-button interface that indicates the brick's active state
- Hi-resolution 178x128 pixel display enabling detailed graph viewing and sensor data observation
- High-quality speaker
- On-brick programming and data logging that can be uploaded into the EV3 software
- Computer-to-brick communication through on-board USB, or external WiFi or Bluetooth dongles
- USB 2.0 host enabling bricks to be linked in a daisy chain, allows WiFi communication and connection to USB memory sticks
- Powered by six AA batteries or the 2050 mAh lithium ion EV3 Rechargeable DC Battery



## EV3 Medium Servo Motor

45503  1 [www](http://www.lego.com) 10-21 yrs

The EV3 Medium Servo Motor is great for lower-load, higher speed applications and when faster response times and a smaller profile are needed in the robot's design. The motor uses tacho feedback for precise control within one degree of accuracy and has a built-in rotation sensor.

- Tacho feedback to one degree of accuracy
- 240-250 RPM
- Running torque of 8 N/cm (approximately 11 oz/in)
- Stall torque of 12 N/cm (approximately 17 oz/in)
- Auto-ID is built into the EV3 software



## EV3 Ultrasonic Sensor

45504  1 [www](http://www.lego.com) 10-21 yrs

The digital EV3 Ultrasonic Sensor generates sound waves and reads their echoes to detect and measure distance from objects. It can also send single sound waves to work as sonar or listen for a sound wave that triggers the start of a program. Students could design a traffic-monitoring system and measure distances between vehicles, for instance. There is an opportunity to discover how the technology is used in everyday items like automatic doors, cars and manufacturing systems.

- Measures distances between one and 250 cm (one to 100 in.)
- Accurate to +/- 1 cm (+/- .394 in.)
- Front illumination is constant while emitting and blinks while listening
- Returns true if other ultrasonic sound is recognized
- Auto-ID is built into the EV3 software



## EV3 Rechargeable DC Battery

45501  1 [www](http://www.lego.com) 10-21 yrs

The lithium ion EV3 Rechargeable DC Battery is designed for use with the EV3 Intelligent Brick and features a capacity of 2050 mAh. It provides longer run time than AA batteries and can be charged without taking the model apart. The battery is included in the EV3 Education Core Set and has a charge time of around three to four hours. It requires the 8887 DC Charger, which is the same charger as used for the rechargeable NXT DC Battery. These are sold separately.



## EV3 Gyro Sensor

45505  1 [www](http://www.lego.com) 10-21 yrs

The digital EV3 Gyro Sensor measures the robot's rotational motion and changes in its orientation. Students can measure angles, create balancing robots and explore the technology that powers a variety of real-world tools like Segway®, navigation systems and game controllers.

- Angle mode measures angles with an accuracy of +/- 3 degrees
- Gyro mode has a maximum output of 440 degrees/second
- Sample rate of 1 kHz
- Auto-ID is built into the EV3 software



## EV3 Large Servo Motor

45502  1 [www](http://www.lego.com) 10-21 yrs

The EV3 Large Servo Motor is a powerful motor that uses tacho feedback for precise control to within one degree of accuracy. By using the built-in rotation sensor, the intelligent motor can be made to align with other motors on the robot so that it can drive in a straight line at the same speed. It can also be used to give an accurate reading for experiments. The motor case design also makes it easy to assemble gear trains.

- Tacho feedback to one degree of accuracy
- 160-170 RPM
- Running torque of 20 N/cm (approximately 30 oz/in)
- Stall torque of 40 N/cm (approximately 60 oz/in)
- Auto-ID is built into the EV3 software



## EV3 Color Sensor

45506  1 [www](http://www.lego.com) 10-21 yrs

The digital EV3 Color Sensor distinguishes between eight different colors. It also serves as a light sensor by detecting light intensities. Students can build color sorting and line-following robots, experiment with light reflection of different colors, and gain experience with a technology that is widely used in industries like recycling, agriculture and packaging.

- Measures reflected red light and ambient light, from darkness to very bright sunlight
- Capable of detecting eight colors. It can tell the difference between color or black and white, or between blue, green, yellow, red, white and brown
- Sample rate of 1 kHz
- Auto-ID is built into the EV3 software





## EV3 Touch Sensor

45507  1  10-21 yrs

The analog EV3 Touch Sensor is a simple but exceptionally precise tool that detects when its front button is pressed or released and is able to count single and multiple presses. Students can build start/stop control systems, create maze-solving robots and uncover the technology's use in devices such as digital musical instruments, computer keyboards and kitchen appliances.

- Cross-axle hole on button
- Auto-ID is built into the EV3 software



## EV3 Cable Pack

45514  7  10-21 yrs

This Cable Pack contains the same seven RJ12 Connector Cables as included in the 45544 EV3 Core Set. The cables can also be used with NXT.

Use these seven connector cables to expand your EV3 element set and get even more out of your EV3 experience.

The Pack contains:

- 4 x 25 cm/10 in. cables
- 2 x 35 cm/14 in. cables
- 1 x 50 cm/20 in. cables



## EV3 Infrared Beacon

45508  1  10-21 yrs

This has been designed for use with the EV3 Infrared Sensor. The beacon emits an infrared signal which the sensor can track. The beacon can also be used as a remote control for the EV3 brick through signals sent to the infrared sensor.

- Requires two AAA batteries
- Four individual channels
- Includes a beacon button and toggle switch to activate/deactivate
- Green LED indicating if the beacon is active
- Auto power-down if the unit is not in action for one hour
- Working distance of up to two meters



## EV3 Infrared Sensor

45509  1  10-21 yrs

The digital EV3 Infrared Sensor detects proximity to the robot and reads signals emitted by the EV3 Infrared Beacon. Students can create remotely-controlled robots, navigate obstacle courses and learn how infrared technology is used in TV remotes, surveillance systems and even in target acquisition equipment.

- Proximity measurement of approximately 50-70 cm
- Working distance from the beacon of up to two meters
- Supports four signal channels
- Receives IR remote commands
- Auto-ID is built into the EV3 software

## Classroom Solutions

### CORE SET EXPANSION SET

### SPACE CHALLENGE SET THE EV3 SOFTWARE



+



### Starter Set 2-3 students

1 x 45544 & 1 x 45517  
LEGO® MINDSTORMS®  
Education EV3 Core Set  
Transformer 10V DC

1 x 45560  
LEGO® MINDSTORMS®  
Education EV3 Expansion Set

1 x 2000045  
LEGO® MINDSTORMS® Education  
EV3 Software Single License

1 x 45570 & 1 x 2005574  
EV3 Space Challenge Set &  
EV3 Space Challenge Activity Pack

### Classroom Set 24 students

12 x 45544 & 12 x 45517  
LEGO® MINDSTORMS®  
Education EV3 Core Set  
Transformer 10V DC

1 x 45560  
LEGO® MINDSTORMS®  
Education EV3 Expansion Set

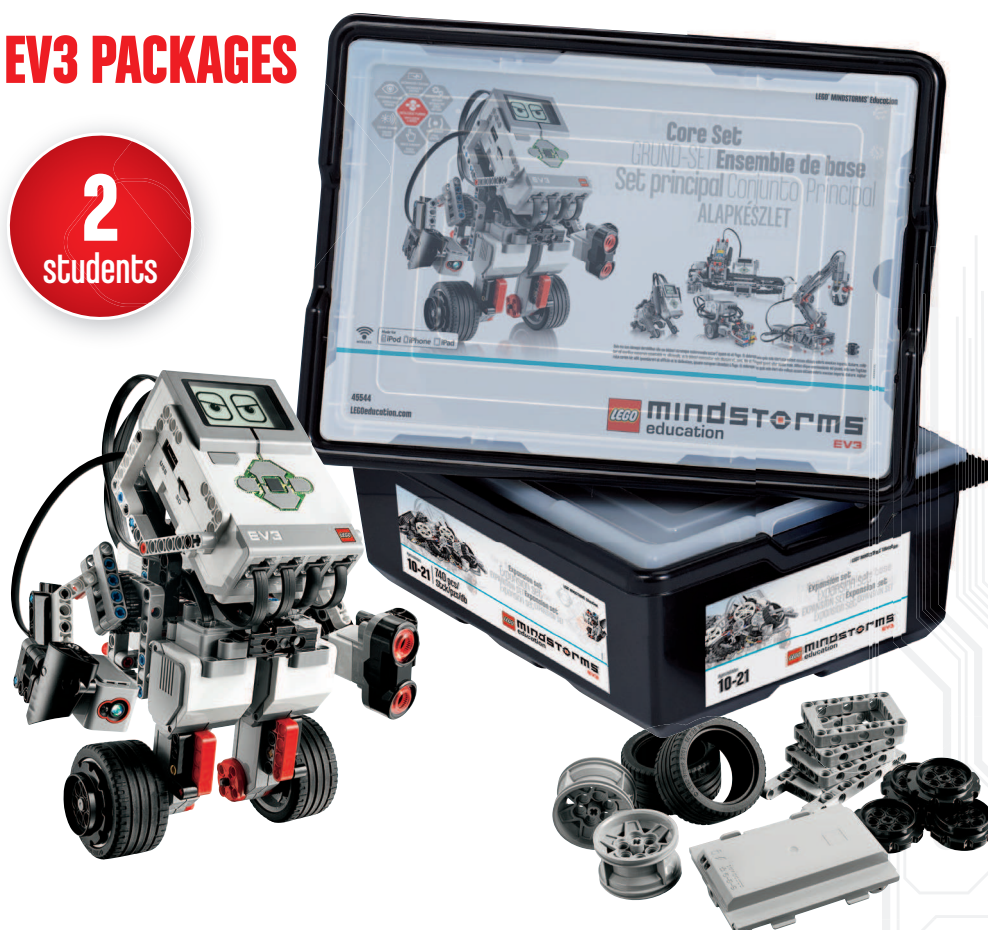
1 x 2000046  
LEGO® MINDSTORMS® Education  
EV3 Software Site License

1 x 45570 & 1 x 2005574  
EV3 Space Challenge Set &  
EV3 Space Challenge Activity Pack

## EV3 PACKAGES

2

students



### LEGO® MINDSTORMS® Education EV3 Package – 2 students

- LEGO® MINDSTORMS® Education EV3 Core Set (45544) 1
- LEGO® MINDSTORMS® Education EV3 Software – Single User License (2000045) 1
- LEGO® MINDSTORMS® Education Transformer 10V DC (45517) 1
- LEGO® MINDSTORMS® Education EV3 Expansion Set (45560) 1
- LEGO® MINDSTORMS® Education EV3 Design Engineering Projects Site License (2005544) 1



30

students



### LEGO® MINDSTORMS® Education EV3 Package – 30 students

- LEGO® MINDSTORMS® Education EV3 Core Set (45544) 15
- LEGO® MINDSTORMS® Education EV3 Software – Site License (2000046) 1
- LEGO® MINDSTORMS® Education Transformer 10V DC (45517) 15
- LEGO® MINDSTORMS® Education EV3 Expansion Set (45560) 8
- LEGO® MINDSTORMS® Education EV3 Design Engineering Projects Site License (2005544) 1





# CHALLENGE YOUR STUDENTS

AND INTRODUCE THEM TO THE FASCINATING  
WORLD OF SCIENCE AND TECHNOLOGY

Junior *FIRST*® LEGO® League (Jr.FLL®) and *FIRST* LEGO League (FLL®) are international enquiry-based programs teaching students aged 6-16 (6-14 in USA/CAN/MX) about science, technology, engineering, and math. Through the process the students obtain core life skills ("Core Values") such as problem-solving, critical thinking and team-work.

Both Jr.FLL and FLL are topic-based. Over the years, students participating in the programs have looked at a number of annual "Challenge" topics. They include:

- Keeping food safe
- Helping older people stay independent, engaged, and connected
- Natural disasters.

As classroom resources, the programs:

- Promote student engagement
- Allow for differentiation
- Promote self-directed learning
- Have real-life connections.

More than 265,000 students from 80 countries take part on an annual basis.

## Junior *FIRST* LEGO League (Jr.FLL)

For children aged 6-9, Jr.FLL captures students' curiosity and directs it toward science and technology. Guided by an adult coach, students get to:

- Design and build a Challenge-related LEGO model with motorized parts
- Create a *Show Me* poster
- Present their work at an event to grown-up, volunteer "reviewers".

Find out how you can get young students hooked on science and technology at [jrFIRSTLEGOLeague.org](http://jrFIRSTLEGOLeague.org)

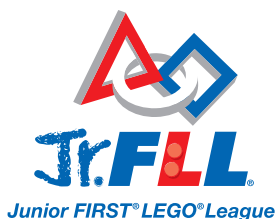
## *FIRST* LEGO League (FLL)

FLL is open for students aged 9-16 (9-14 in USA/CAN/MX). A FLL Challenge consists of two parts:

- A research assignment (the "Project") – research and come up with innovative ideas for solving a real-world problem
- A "Robot Game" – design and program a LEGO® MINDSTORMS® robot to solve missions on a special obstacle course.

After 8-10 weeks the teams meet and compete at regional tournaments and present their work to panels of judges.

Find out how to join the challenging fun at [FIRSTLEGOLeague.org](http://FIRSTLEGOLeague.org)



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## WORLD ROBOT OLYMPIAD

Taking place in 50+ countries worldwide, an estimated 70,000 participants compete in 4 exciting competition categories:

- Regular – Design and program robots that solve challenging and fun tasks
- Open – Create and present theme-based robotics solutions
- WRO GEN II Football – teams of two autonomous robots play head-to-head in action-packed football (soccer) tournaments
- College Regular – and advanced challenge for students 17+.

Local and national WRO tournaments are organized by the National Organizer

in each member country. All member countries qualify teams that are invited to participate in the annual WRO international final.

Find out how to get involved at [wroboto.org](http://wroboto.org)  
LEGO Education is a Premium Sponsor of World Robot Olympiad Association.







**Replacement  
Pack Available**  
See page 83

## Green City Challenge Set

9594 1-6  1365  [www](http://www.lego.com) 9+ yrs

A theme-based set that guides students through LEGO® MINDSTORMS® building and programming in a structured way. It contains three training mats, a challenge mat and lots of elements for building the challenge models, such as a power plant, wind turbine and dam. The training mats provide a venue where students can test and practice their programming skills. The challenge mat offers a real life setting for solving different missions so students can apply the skills acquired through the training. Requires 9797, 2009594 and 2000080.

## Key learning values

- Engaging in hands-on STEM education
- Working with prototyping and design
- Acquiring problem-solving and team working skills
- Gaining hands-on experience with programming, sensors, motors and intelligent units



## Activity Pack for Green City Challenge Set

2009594 [www](http://www.lego.com) 9+ yrs

This CD ROM activity pack is ideal as a step-by-step introduction to robotics in the classroom or as preparation for robotics competitions. The seven easy-to-follow training activities, each supported by student worksheets, guide the students from simple to more advanced programming. They are then challenged to apply their programming and problem-solving skills by making their robots solve real-world engineering challenges related to renewable energy. Comprehensive teacher notes provide everything needed for easy implementation, including programming examples, building instructions, mission and rules, ways to differentiate, extension ideas, and more. Also includes a project that can be used for further research into the challenge topic of renewable energy. Provides 45 hours of tuition. Requires 9797, 9594 and 2000080.



## LEGO® MINDSTORMS® Education Base Set

9797 1-3  431  [www](http://www.lego.com) 8+ yrs

This set enables students to build and program real-life robotic solutions. Includes the programmable NXT Brick, providing on-brick programming and data logging, three interactive servo motors, ultrasonic, sound, light and two touch sensors, a rechargeable battery, connecting cables, and full-color building instructions. Software (2000080) and battery charger (9833/8887) are sold separately.

### Key learning values

- Developing solutions, selecting, building, testing and evaluating
- Brainstorm to find creative alternative solutions
- Learn to communicate, share ideas and work together
- Hands-on experience with sensors, motors and intelligent units

**Replacement Packs Available**  
See page 83



## LEGO® MINDSTORMS® Education Resource Set

9695 1-3  817  [www](http://www.lego.com) 8+ yrs

This set features a wide range of elements that allow you to build and program MINDSTORMS® robots with even more functions than ever before. Includes plenty of special elements such as belts, unique connectors, a worm gear, structural elements, as well as other LEGO® elements like beams, axles and connectors. It is the ideal supplement to your 9797 Base Set for classroom, after school or robotic competition use! Download free building instructions and programming examples for several great robots on LEGOeducation.com.

**Replacement Packs Available**  
See page 83



## LEGO® MINDSTORMS® Education NXT Software v.2.1.6

2000080 [www](http://www.lego.com) 8+ yrs

This powerful, easy-to-use software for programming and data logging is icon based. It incorporates a Robot Educator step-by-step guide with 46 tutorials, from beginner to advanced levels. Data logging functionalities, including graph viewer, make it easy to collect and analyze data from sensors. The software incorporates a comprehensive digital user manual and is based on LabVIEW.

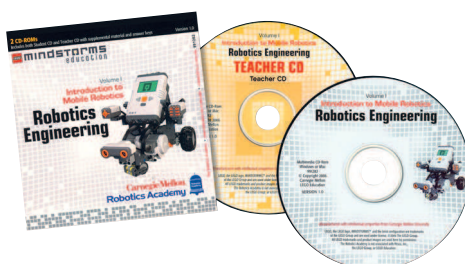
### Key learning values

- Using input and output devices and producing a simple set of sequential instructions linking cause and effect
- Developing and testing a system to monitor and control events
- Using intuitive prediction tools to get firsthand experience with making hypothesis
- Using the scientific inquiry process when gathering and analysing data sets
- Integrating Math and Science using physical constants, units of measurement, coordinate systems, min, max, mean and linear formulas

## Robotics Engineering Volume 1: Introduction to Mobile Robotics

2009787 [www](http://www.lego.com) 12+ yrs

Getting started in the classroom – this two-CD set provides 45 hours of tuition divided up in 6 main projects, 6 investigations, 3 anytime projects and 3 end-of-project activities. Developed by Carnegie Mellon University's Robotics Academy, it is a comprehensive step-by-step guide to robotics engineering. Includes presentations, video clips, worksheets and extensive teacher introduction materials. Activities can be extended to include guided research projects, see 2009788.

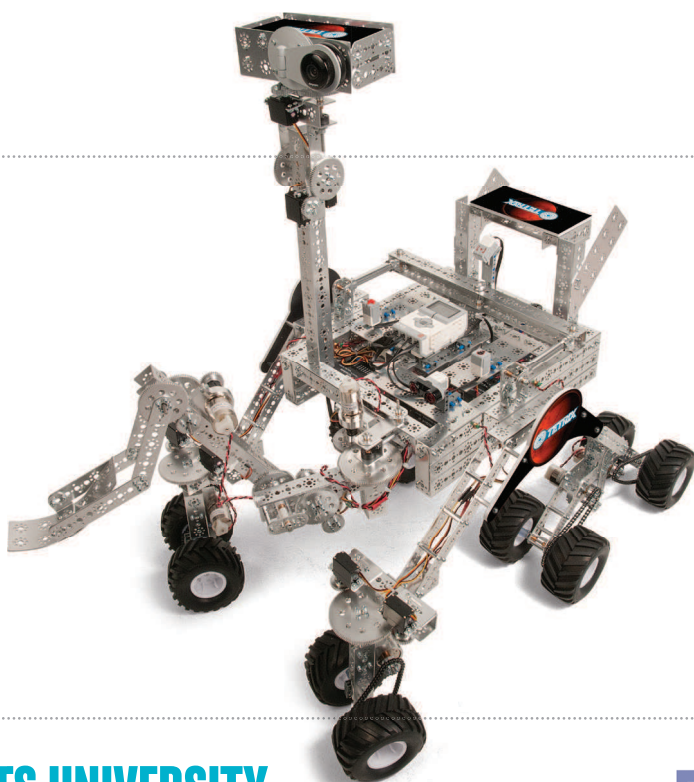


# More Opportunities with 3rd Party Products

A wide range of LEGO® MINDSTORMS® Education compatible 3rd party products are available to support and expand your robotics experience both inside and outside the classroom. They provide even more opportunities to carry out curriculum-relevant activities, experiments and data collection.

For both EV3 and NXT, different partners have developed sensors or sensor adaptors that are tested and certified by LEGO®. These products come in original LEGO MINDSTORMS sensor housing and are accompanied by matching programming blocks for the EV3 and NXT software environments. The list of 3rd party sensor companies includes, among other, HiTechnic, Vernier and DCP Microdevelopments.

Visit [LEGOeducation.com](http://LEGOeducation.com) or contact your local dealer for more information.



## TUFTS UNIVERSITY

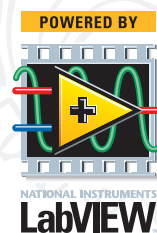
Outreach and development partner for more than 15 years

Tufts' Center for Engineering Educational Outreach, CEEO, in Boston, USA, has worked with LEGO® Education for many years. The center was a major partner in development of the first LEGO® MINDSTORMS® resources for schools in the 1990s; helping to create the innovative software interface for the RCX brick.

Today CEEO still supports development of LEGO Education resources across the portfolio, researching new and even more effective ways to bring engineering and design processes to teachers and students of all ages.

Tufts outreach programs are founded on the principle of providing students with open-ended challenges to engage their problem-solving skills and to learn Science, Technology, Engineering and Math.

With LEGO Engineering Conferences, which are also supported by CEEO, we are able to bring together teachers to learn from each other and spread the passion for teaching engineering in the classroom. For more details see [LEGOengineering.com](http://LEGOengineering.com)



## LabVIEW for LEGO® MINDSTORMS®

NI LabVIEW for LEGO® MINDSTORMS® National Instruments LabVIEW for LEGO MINDSTORMS software is a new education-focused version of the company's professional LabVIEW graphical system design software used by scientists and engineers. Developed specifically for high school students to use with the LEGO Education robotics platform in classrooms or after-school robotics competitions, LabVIEW for LEGO MINDSTORMS is a teaching tool that helps students visually control and program MINDSTORMS robots. The desktop software turns any LEGO MINDSTORMS Education set into a full feature science and engineering learning station, preparing students for university courses and engineering careers where LabVIEW is already used.

## TETRIX™ by PITSCO

Revolutionary Metal Building System for LEGO® MINDSTORMS® Education

Add a new dimension to LEGO® MINDSTORMS® Education robots! TETRIX™ is the only metal building system endorsed by the LEGO Group for use with LEGO MINDSTORMS. Developed in close collaboration with LEGO Education, TETRIX is an excellent add-on for high school and higher education, and is also available for use in FIRST Tech Challenge and WRO. The TETRIX platform includes a wide variety of aluminum structural and motion elements, many types and sizes of metal gears, durable and powerful DC and servo motors, and the patented Hard Point Connector that enables the connection of TETRIX elements to LEGO Technic. Visit [LEGOeducation.com](http://LEGOeducation.com) or contact your local dealer for more information.



Center for Engineering Education and Outreach

*"We have worked with LEGO MINDSTORMS products since the late 90's and have found the robotics platform has significant benefits in student motivation, student understanding of math, science and engineering skills. Our research with both 8-year-olds and 18-year-olds provides evidence that with these robotics sets, students are able to solve authentic engineering problems in many different ways"*

Quote Chris Rogers, Professor, Tufts University, USA