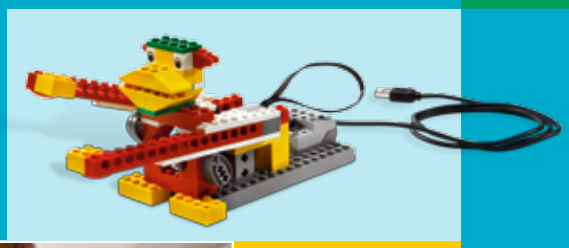
LEGO education

Machines & Mechanisms



Robotics

2011

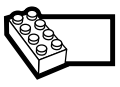
Classroom Solutions for Schools

Index

Storage Solution icon

Sets with this icon are delivered in a plastic storage box.

Piece Count icon



This icon shows how many elements the sets contain.

Web icon

This icon shows that you can find more materials on our website.

Creative Classroom Solutions
from LEGO® Education

Machines & Mechanisms
Early Simple Machines
From 5 years

Children explore objects in the world around them, and build and play with models that help them to understand the movement of familiar things. They experiment with the concepts of balance, stability, buoyancy and much more.

See the primary school range pages 10-11.

Machines & Mechanisms
Simple & Powered Machines
From 8 years

Children deepen their understanding of how forces affect motion and explore concepts of energy. They build more complex mechanisms and use them to make accurate observations, measurements and records; and to design their own solutions.

See the primary and secondary school range pages 12-17.

Robotics
LEGO® Education WeDo™
From 7 years

The exciting LEGO® Education WeDo™ concept provides a fun and easy way to get started on simple robotics. Children build models, attach simple sensors and motors, which are plugged into their computers, and configure behaviour using intuitive, icon-based software.

See the primary school range pages 20-23.

Robotics
LEGO® MINDSTORMS® Education
From 8 years

Students build robots and use software to plan, test and modify sequences of instructions for a variety of real-life robotic behaviours. They gather and analyse data from sensors using datalogging functionalities such as graph viewer. Robotics is an exciting way to bring science, technology, engineering and mathematics to life in the classroom.

See the primary and secondary school range pages of LEGO® MINDSTORMS® Education brick sets, software and activity packs pages 24-31.

education

Hey!

Check out our website!

LEGOeducation.com

Free Downloads at LEGOeducation.com

Looking for inspiration or simply more information? Visit our website and experience how LEGO® Education sets are effective tools for covering your curriculum targets. Lots of free downloads available!

Videos

Watch our solutions in use in a classroom setting.

Short video sequences for the students to connect to the task.

Animations

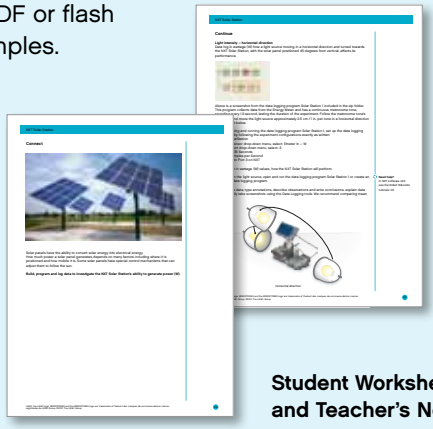
See engaging animations and share them with your students.

Building Instructions

Build even more models.

Activity Examples

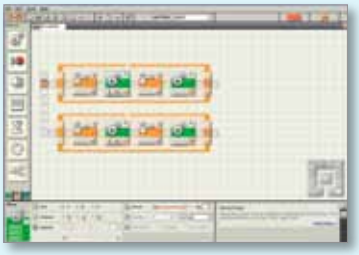
Download PDF or flash activity examples.



Student Worksheets and Teacher's Notes

Programming Examples

New inspiration for programming your robot!



4Cs

Activities with Natural Flow

Activity Packs from LEGO® Education are developed by experienced educators and have a natural flow that engages and motivates students. We call it the 4C approach. It consists of four phases: Connect, Construct, Contemplate, and Continue.

Connect

It is important to capture students' interest in order to have a positive and motivating learning environment. LEGO Education activities always begin with an engaging challenge introduced through real-life video clips, photos, stories, animations, etc. which students can relate to and find compelling.

Construct

Students work in teams to solve an open-ended building task related to the challenge. They make their own solutions and plan, build and test their models or software program.

Contemplate

In this phase, students think about what they have just constructed and achieved. They discuss the project at hand, reflect on and adapt their ideas, and teachers can encourage this process by asking questions.

Continue

Extension ideas are provided that present a new challenge within the same theme. Students are encouraged to change or add features to their models, thereby leading them to a new Connect phase. This allows them to enter a positive learning spiral, in which they take on increasingly difficult challenges.

education

Curriculum Relevance

Let's build a future of inquisitive scientists, innovative designers and creative engineers.

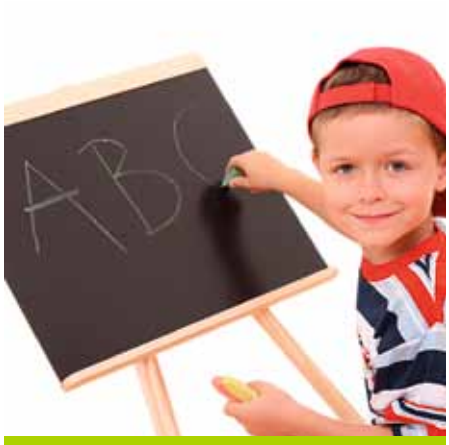
LEGO® Education brick sets, teacher guides and activity packs provide exciting, hands-on projects for children from 5 to 16+ years.

Our solutions are particularly relevant to teaching design technology and engineering, physical science, scientific inquiry and mathematics. For examples of classroom activities visit the LEGO Education global website and search Activities.

> It's all about teaching kids how to solve problems; building something as a solution to a problem or an answer to a question. Teaching problem-solving is so important and LEGO solutions do that really well. There's lots of easy stuff to start with, building cards and models for inspiration, then as the children gain experience they begin to do really creative things.

Tracy Polte, Elementary School Teacher, Shady Hill School, MA, USA.

LEGOeducation.com



ABC 123

Key Learning Values:

- Understanding the relationship between the spoken and written word
- Developing letter and sound recognition
- Recognising and naming numbers
- Learning to count, add and subtract
- Investigating colours, shapes, patterns and symmetry

3+
156

9530
Letters Set

A versatile set that provides a fun, hands-on way for children to develop basic skills in early literacy, letter and sound recognition, fine motor skills and language skills. Creating special characters, symbols and pictures is easy – just draw on the blank tiles. Also contains 2 white building plates.

- Letter and sound recognition
- Upper and lower case letters
- Word building

1½+

9805
Play Wall

Utilize wall space for playing with letters, numbers or other elements. The practical storage bin beneath the board ensures that "the next piece" is always within reach, and keeps elements off the floor.

3+
352

9531
Numbers & Mosaics Set

With loads of number and sign tiles, this big set provides the perfect way for future mathematicians to get a head start on investigating numbers and learning to count, add and subtract. The mosaic tiles also allow children to create countless patterns while learning all about shapes, colours, sequences and symmetry.

- Exploring number facts
- Exploring colours and shapes
- Pattering and sequencing
- Investigating symmetry

education

Machines & Mechanisms

Machines & Mechanisms

Learning targets covered:

Science:

- Communicate changes in movements of objects resulting from action
- Observe, predict and record
- Learn about gravity, friction and air resistance
- Measure forces and identify their direction

Technology:

- Recognize characteristics of familiar things
- Find out how mechanisms can be used to move things
- Learn about mechanical and pneumatic control systems

Creative development:

- Explore ideas
- Design and make things for different purposes

Mathematics:

- Learn about shape and space through practical activities
- Problem solving, reasoning
- Fractions, percentages and number operations

Develop Gears
Mechanisms
Science Explore
Machines
Wheels Problem-solving
Technology Ideas

LEGO education

Early
Simple Machines
Explore Basic Mechanics

5+

9656

Early Simple Machines Set

The Early Simple Machines Set provides eight mechanical models and eight double-sided, full-colour building instructions. The set includes gears, levers, pulleys, wheels and axles, as well as a plastic punch-out sheet with eyes, sails, scales and wings. Combine with the 2009656 activity pack to carry out eight lesson plans, each with 20-minute extension activities, and four problem-solving tasks.

- Exploring basic mechanical principles such as gears, levers, pulleys, wheels and axles
- Investigating force, buoyancy and balance
- Solving problems through design
- Working with others and sharing findings

5+

2009656

Activity Pack for Early Simple Machines Set

The activity pack for the 9656 Early Simple Machines Set includes eight 45-minute lessons, each with extension activities of up to 20 minutes, and four additional open-ended problem-solving activities. Illustrations introduce playful problems that the children must solve.

- Exploring basic mechanical principles such as gears, levers, pulleys, wheels and axles
- Investigating force, buoyancy and balance
- Solving problems through design
- Working with others and sharing findings

5+

7

9999
Upgrade Kit for 9654

Combine your existing 9654 Early Simple Machines II Set with the 9999 Upgrade Kit to create the equivalent set to the new 9656 Early Simple Machines Set. The Upgrade Kit includes all of the new elements from the 9656 set: six LEGO bricks, a plastic punch-out sheet and eight inspiration cards – all delivered in a plastic bag with zipper. The Upgrade Kit enables existing users of the 9654 set to carry out the activities provided in the 2009656 Activity Pack.

5+

107

9660
Early Structures Set

This set provides building ideas for 12 different structures, such as bridges and towers, as well as inspiration for four additional problem-solving models. Pulley wheels, movable hooks on strings, axles, double-sided activity cards and element overview included.

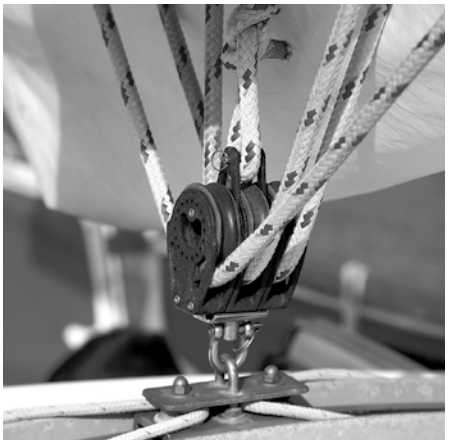
- Exploring basic structures such as towers, bridges and walls
- Exploring balancing, strength and stability, and moving parts
- Problem solving

Colours of and decorative designs on elements may vary.

education

Simple & Powered Machines

Explore Real Life Machines & Mechanisms



8+

396

9686

Simple & Powered Machines Set

The core brick set in our range of Machines & Mechanisms solutions, this set includes full-colour building instruction booklets for 10 principle models and 18 main models. Combine with curricular-relevant activity packs and add-on sets to carry out a broad range of activities within design technology, science and mathematics.

- Building and exploring real life Machines & Mechanisms
- Investigating powered machines with the motor
- Using plastic sheets for calibration and capturing wind
- Exploring gearing mechanisms with the assorted gear wheels incl. differential

8+

WWW

2009686
Introducing Simple & Powered Machines

With this activity pack students get a fundamental understanding of simple machines, structures and mechanisms. The pack features 37 principle model activities, 14 main activities, including extension activities, and six problem-solving tasks. Flash animations introduce the activities. Teacher's notes, student worksheets and glossary included.

- Investigating the principles of simple machines, mechanisms and structures
- Experimenting with balanced and unbalanced forces
- Experimenting with friction
- Capturing, storing and transferring wind energy
- Measuring distance, time, speed and weight
- Calibrating scales
- Investigating powered forces and motion, speed and pulling power

10+

WWW

2009687
Advancing with Simple & Powered Machines

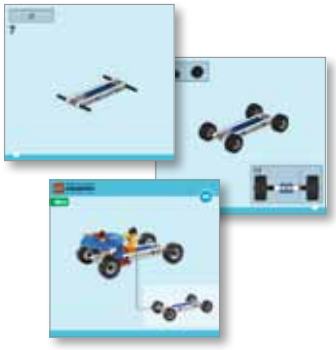
This activity pack allows students to get an in-depth understanding of simple machines, mechanisms, structures and mechanical advantage. It includes 38 principle model activities, four main activities, including extension activities, and eight problem-solving activities. Real-life video clips introduce students to the activities. Teacher's notes, student worksheet and glossary included.

- Investigating the principles of simple machines, mechanisms and structures
- Mechanical advantage
- Balanced and unbalanced forces
- Equilibrium
- Block and tackle
- Effect of force on an object
- Experimenting with friction
- Calculating speed, distance, time and weight
- Identifying dependent and independent variables

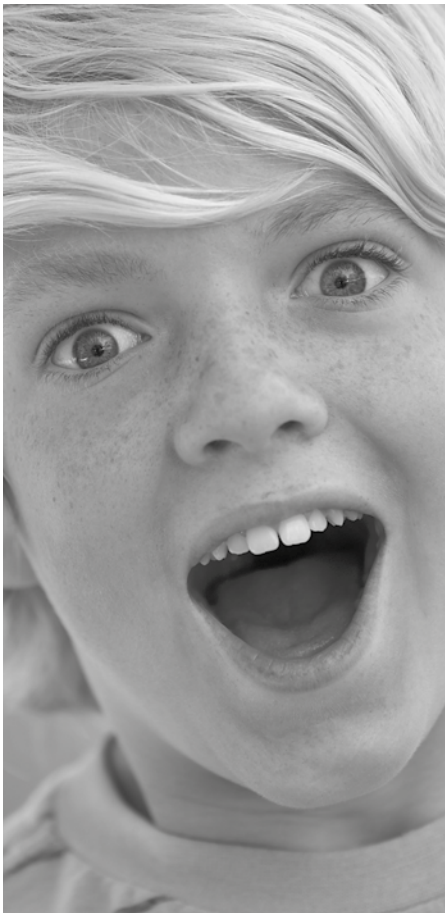
Activity Pack
Understanding of Basic Principles

Short video sequences for the students to connect to the task

Building Instructions



Student Worksheets & Teacher's Notes



Wheel and Axle
Gear
Cam
Lever
Inclined Plane
Pulley
Wedge
Screw
Structures
Pawl and Ratchet

10+

9641

Pneumatics Add-on Set

WWW

31

The Pneumatics Add-on Set for the 9632/9686 Base Set provides five principle models and four real-life pneumatics models. Includes full-colour building instructions, pumps, tubes, cylinders, valves, air tank and a manometer. Combine with the 2009641 activity pack to carry out 14 principle model activities, four new lesson plans and two problem-solving tasks.

- Building and exploring pneumatics through real-life LEGO models
- Investigating power systems and components
- Pressure measuring in psi and bar
- Exploring kinetic and potential energy

10+

2009641

Activity Pack for 9641

WWW

This activity pack provides 14 principle model activities, four 45-minute pneumatics lessons each with extension activities of up to 20 minutes, and two additional problem-solving tasks. Video clips introduce the activities by showing real-life machines, which are similar to the LEGO models used in the lessons.

- Building and exploring pneumatics through real-life LEGO models
- Exploring sequence and control
- Engaging students in engineering and design
- Using measures and data analysis to describe and explain outcomes

8+

9688

Renewable Energy Add-on Set

WWW

12

New

This add-on set for 9686 allows students to learn all about renewable energy sources. The set provides a range of elements including the unique LEGO Energy Meter, a solar panel, blades, a motor/generator, LED lights and an extension wire. Includes full-colour building instructions for six real-life LEGO models. Combine with the 2009688 activity pack to carry out six lessons and four problem-solving activities. Also works with MINDSTORMS Education, see 9797 on page 24.

- Building and exploring renewable energy through real-life LEGO models
- Exploring energy supply, transfer, accumulation, conversion and consumption
- Engaging students in engineering and design

Hydro
Wind
Solar
Technology
Renewable
Energy
Manual Power

10+

2009688

Activity Pack for Renewable Energy Add-on Set

New

WWW

This activity pack provides six 45-minute lessons and four problem-solving activities that allow students to explore the three major renewable energy sources, solar, wind and water, through real-life LEGO models. Includes a wide range of real-life images, ideal for introducing them to the topic and task at hand. Teacher's notes, student worksheets and glossary included.

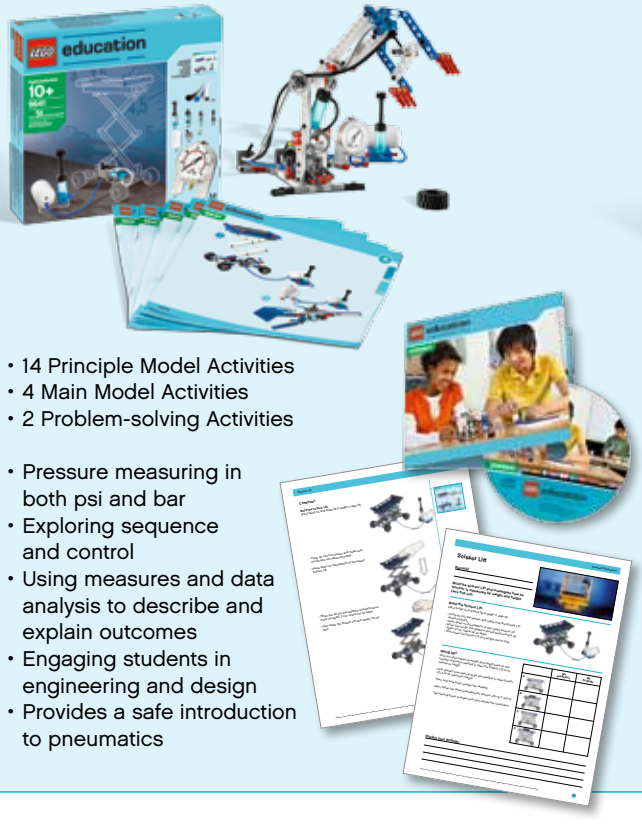
- Exploring renewable energy sources
- Investigating energy supply, transfer, accumulation, conversion and consumption
- Using measurements and data analysis to describe and explain outcomes

9686 Simple & Powered Machines Set

- Principles of simple machines, mechanisms and structures
- Experimenting with balanced and unbalanced forces
- Experimenting with friction
- Measuring distance, time, speed and weight
- Calibrating scales

- 37 Principle Model Activities
- 14 Main model Activities
- 6 Problem-solving Activities

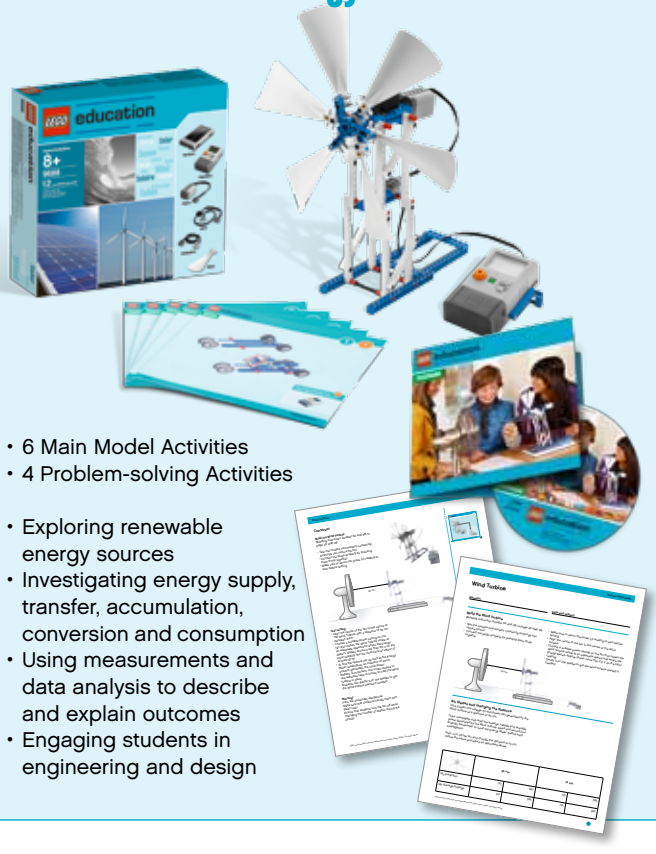
9641 Pneumatics Add-on Set



- 14 Principle Model Activities
- 4 Main Model Activities
- 2 Problem-solving Activities

- Pressure measuring in both psi and bar
- Exploring sequence and control
- Using measures and data analysis to describe and explain outcomes
- Engaging students in engineering and design
- Provides a safe introduction to pneumatics

9688 Renewable Energy Add-on Set



- 6 Main Model Activities
- 4 Problem-solving Activities

- Exploring renewable energy sources
- Investigating energy supply, transfer, accumulation, conversion and consumption
- Using measurements and data analysis to describe and explain outcomes
- Engaging students in engineering and design

Colours of and decorative designs on elements may vary.

education

Classroom Solutions

9686

2009686

2009687

Starter Set

2-3 students

- 1x 9686 Simple & Powered Machines Set

8+

- 1x 2009686 Introducing Simple & Powered Machines

10+

- 1x 2009687 Advancing with Simple & Powered Machines

Classroom Set

24 students

- 12x 9686 Simple & Powered Machines Set

8+

- 1x 2009686 Introducing Simple & Powered Machines

10+

- 1x 2009687 Advancing with Simple & Powered Machines

8+ New

9667 LEGO® Solar Panel

The Solar Panel provides sufficient power to operate the LEGO Energy Meter and motors. It delivers: 5V, 4mA in direct light from a 60W incandescent bulb positioned 25 cm from the solar panel (>2000 lux); and 5V, 20mA in direct light from a 60W incandescent bulb positioned 8 cm from the panel (>10,000 lux).

8+ New

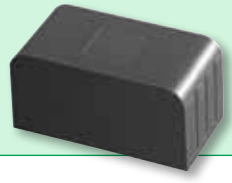
9668 Energy Display

This element displays input and output in volts, watts, amps, and energy storage level in joules. Combine with 9669 Energy Storage to form the LEGO Energy Meter.

8+ New

9669 Energy Storage

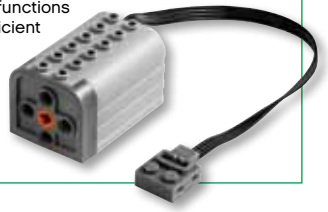
This Ni-MH battery with connector is designed to be combined with the 9668 Energy Display. When combined, the two elements form the LEGO Energy Meter. Storage capacity: 150 mAh.



7+ New

9670 E-Motor

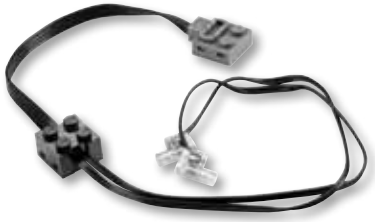
The E-Motor is a 9V motor with an internal gearbox. Its 9.5:1 gearing ratio provides a maximum torque of 4.5 Ncm and approximately 800 rotations per minute without load. It also functions as a very efficient generator.



7+

8870 Power Functions Light

Add bright LED lights to your models to create glowing eyes, illuminated headlights, and anything else you can imagine and build!



7+

8881 Power Functions Battery Box

Give even more power and movement to your models with an extra battery box to supply power to your Power Functions motors! Each battery box can power 2 XL-Motors or 4 M-Motors at the same time. Requires 6 AA (1,5V) batteries, not included.

9641

2009641

9688

2009688

Add-On

2-3 students

1x	9641 Pneumatics Add-on Set	1x	2009641 Activity Pack for Pneumatics Add-on Set

Add-On

1x	9688 Renewable Energy Add-on Set	1x	2009688 Activity Pack for Renewable Energy Add-on Set

Classroom Set

24 students

12x	9641 Pneumatics Add-on Set	1x	2009641 Activity Pack for Pneumatics Add-on Set

Classroom Set

12x	9688 Renewable Energy Add-on Set	1x	2009688 Activity Pack for Renewable Energy Add-on Set

7+

8883
Power Functions M-Motor

Build an extra medium-strength, medium-sized M-Motor into your LEGO creations and watch things start moving!

7+

8871
Power Functions Extension Wire 20”

Build your Power Functions-equipped models bigger, better and more mechanized and motorized than ever before by adding this 20-inch (50 cm) extension wire!

7+

8878
Power Functions Rechargeable Battery Box

This rechargeable battery box has built-in Lithium polymer batteries for low weight and maximum power.

Use the 8887 10VDC LEGO Transformer to charge the battery!

- Motor speed can be controlled via the battery box speed control dial!
- Output voltage is 7.4V!

7+

8882
Power Functions XL-Motor

Add an extra XL-Motor to your models! This super-strong motor will give plenty of power to your models, whether it’s spinning a wheel or turning a system of gears. Use the “M” Motor to animate larger builds.
Requires battery box (Item 8881), not included.

7+

8886
Power Functions Extension Wire 8”

Build your Power Functions-equipped models bigger, better and more mechanized and motorized by adding this 8-inch (20 cm) extension wire!

8+

8887
Transformer 10V DC

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

education

Robotics

Robotics

Examples of learning targets covered using robotics in the classroom:

Information and Communication Technology, ICT:

- Use simulations and explore models
- Use ICT to measure, record, respond to and control events

Science:

- Investigate energy, force and speed
- Determine the speed of a moving object and use the quantitative relationship between speed, distance and time
- Using the scientific inquiry process when gathering and analysing data sets

Technology:

- Develop solutions, selecting, building, testing and evaluating

Mathematics:

- Understand and use fractions, decimals, percentages, ratios and proportions

Research
Robotics
Software
Learn
Introduction
Activity Pack
Programming

education

Discover Engineering
Explore
Literacy Maths
Science Technology
Language
Communication

Robotics
LEGO® Education WeDo™

7+

www

158

9580

LEGO® Education WeDo™ Construction Set

The WeDo Construction Set enables students to build and program simple LEGO models that are plugged into a computer. The set contains more than 150 elements, including a motor, motion and tilt sensors, and the LEGO USB Hub. Combine with the 2009580 Activity Pack to carry out 12 theme-based activities. Software is sold separately, see 2000097.

- Designing and making
- Brainstorm to find creative alternative solutions
- Learn to communicate, share ideas and work together

7+

2000094

LEGO® Education WeDo™ Site License Agreement

The Site License Agreement allows WeDo Software to be used on any compatible computer at the purchasing institution. The Agreement is necessary when installing the software on more than one computer. Requires pre-purchase of 2000097 WeDo Software.

7+

2000097

LEGO® Education WeDo™ Software v.1.2 and Activity Pack

www

Easy-to-use software and 12 theme-based activities for the WeDo Construction Set in one package! The drag-and-drop software, powered by LabVIEW, is icon-based and provides an intuitive programming environment. Features the digital Getting Started Guide with building tips and programming examples. Activities are divided into four themes: Amazing Mechanisms, Wild Animals, Play Soccer and Adventure Stories and provide up to 24 hours of instruction and project-based learning. Teacher notes, glossary and building instructions included.

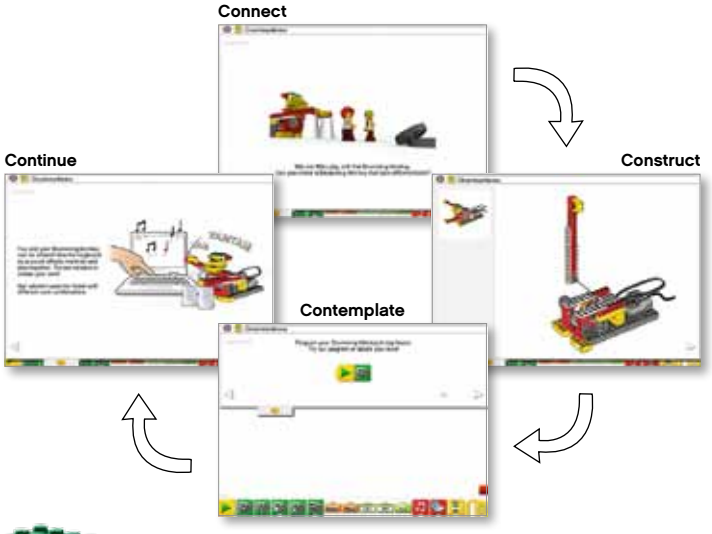
- Programming, using software , designing and creating a working model
- Use software to acquire information
- Use feedback to adjust a programming system output
- Working with simple machines, gears, levers, pulleys, transmission of motion
- Measuring time and distance, adding, subtracting, multiplying, dividing, estimating, randomness, using variables
- Narrative and journalistic writing, storytelling, explaining, interviewing, interpreting

A Complete Package

2000097
LEGO® Education WeDo™ Software v.1.2 and Activity Pack

The Software:

- Icon-based, drag-and-drop programming environment
- Getting Started Guide with building and programming examples included
- Automatically detects sensors and motors when attached to the LEGO USB Hub
- Supports programming of the computer keyboard, sound and microphone



The CD-ROM Activity Pack:

- Cross-curricular activities that meet a broad range of curriculum goals
- Ideal for introducing technology into other areas of the curriculum
- Activities that integrate into the WeDo Software

LEGO education

Inspiration

Give your students even more opportunities to design, build and program exciting models such as a galloping horse or a roaring dragon. Simply purchase the Sceneries Set (9385) or the Community Workers Set (9247) to add that extra something to your existing LEGO® Education WeDo™ sets, and let them unleash their imagination! For more inspiration visit LEGOeducation.com.

4+

New

256

9348 Community People Set

Add even more life to your bustling LEGO town! This set features indispensible people from everyday life in a community, such as policemen, a postman, hospital staff, a mechanic and many more. Includes 22 minifigures, plus a variety of accessories, such as food, animals, a laptop, a bicycle and a backpack!

- Exploring community roles and responsibilities
- Understanding community helper functions
- Developing expressive language relating to characters and functions

4+

1207

9385 Sceneries Set

Includes bricks in all sorts of colours as well as special elements such as spiders, snakes, wands, roast chickens, flowers, treasure chests, and much more!

Programming Examples

Galloping Horse

Roaring Dragon

For more inspiration visit LEGOeducation.com

4+

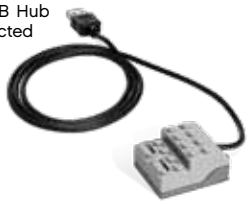
1490

9314 Rescue Services Set

A big set with elements and minifigures for exploring the main rescue services: police, fire and hospital, as well as all the vehicles required to help. Combine with LEGO Education WeDo and let your students build and program a fire-fighting scene with a fire station and a motorized system that moves the fire-fighter minifigure in and out of the station.

7+
9581
LEGO® USB Hub

The LEGO USB Hub designed for the WeDo Construction Set controls sensors and motors via the WeDo Software when connected to a computer's powered USB port. This two-port hub transmits power and data to and from the computer, and both ports are able to control motors and sensors. The LEGO USB Hub is automatically detected by the WeDo Software when connected to a computer.



7+
8883
Power Functions M-Motor

Build an extra medium-strength, medium-sized M-Motor into your LEGO creations and watch things start moving!

7+
9583
Motion Sensor

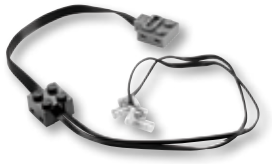
The motion sensor designed for the WeDo Construction Set can detect objects within a range of 15 cm, depending on the design of the object, when attached to the LEGO USB Hub. The motion sensor is automatically detected by the WeDo Software when attached to the LEGO USB Hub.

7+
9584
Tilt Sensor

The tilt sensor designed for the WeDo Construction Set detects changes within six different positions: Tilt This Way, Tilt That Way, Tilt Up, Tilt Down, No Tilt and Any Tilt. The tilt sensor is automatically detected by the WeDo Software when connected to the LEGO USB Hub.

7+
8870
Power Functions Light

Add bright LED lights to your models to create glowing eyes, illuminated headlights, and anything else you can imagine and build!



Classroom Solutions

9580	2000097	2000094
		

Starter Set

2-3 students	9580	2000097	2000094
	1x LEGO® Education WeDo™ Construction Set	1x LEGO® Education WeDo™ Software v.1.2 and Activity Pack	0x LEGO® Education WeDo™ Site License Agreement

Classroom Set

24 students	9580	2000097	2000094
	12x LEGO® Education WeDo™ Construction Set	1x LEGO® Education WeDo™ Software v.1.2 and Activity Pack	1x LEGO® Education WeDo™ Site License Agreement

Colours of and decorative designs on elements may vary.

mindstorms education

Research
Robotics
Software
Learn
Introduction
Activity Pack
Programming

Robotics
LEGO® MINDSTORMS® Education

8+

9797

LEGO® MINDSTORMS® Education Base Set

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-colour building instructions. Software (2000080) and battery charger (9833/8887) are sold separately.

- 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

8+

2000078

NXT Site License Agreement

The site license agreement allows LEGO MINDSTORMS Education NXT software to be used on any compatible computer at the purchasing institution. Is necessary when installing the software on more than one computer. Requires pre-purchase of 2000077/2000080 MINDSTORMS Education NXT Software.

More Great Robots

Let your students take LEGO® MINDSTORMS® Education robots to the next level and add even more fun to learning. Download building instructions and programming examples for nine cool models at MINDSTORMSEducation.com.

Grand Four Belt Rover: It detects and climbs obstacles.

Belt-driven Colour Sorter: Get your colours in order.

Robot Arm: Helps you pick things up.

Humanoid: Watch it walk and move like a person.

Scorpion: Watch out for its sting!

Intelligent Car:
Steering and differential gives it unique driving capabilities.

8+ WWW 817

9695
LEGO® MINDSTORMS® Education Resource Set

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, axels 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 MINDSTORMSEducation.com.

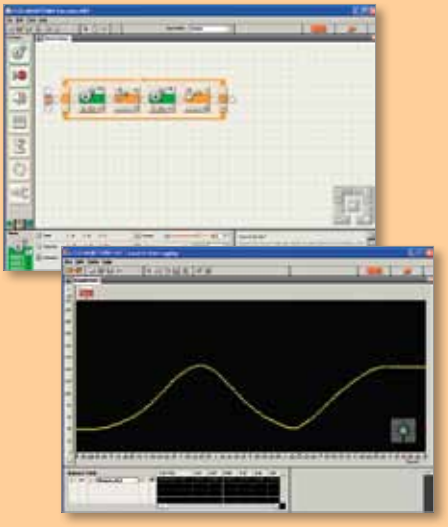
New

8+ WWW

2000080
LEGO® MINDSTORMS® Education NXT Software v.2.1 (with Data Logging)

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 analyse data from sensors. The software incorporates a comprehensive digital user manual and is based on LabVIEW.

- 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 first hand experience with making hypothesis
- Using the scientific inquiry process when gathering and analysing data sets
- Integrating Maths and Science using physical constants, units of measurement, coordinate systems, min, max, mean and linear formulas



LEGO MINDSTORMS Education NXT Programming

- Easy-to-use icon based programming
- Intuitive drag and drop programming
- From beginner to advanced level
- Easy communication with and download to NXT brick
- Simple sharing and customization of programs

LEGO MINDSTORMS Education NXT Data Logging

- Teach science using intuitive predict and analyze tools
- Easy-to-use graph based data logging environment
- Use autonomous robots for data logging
- Support for both remote and live data logging
- Log data on up to four sensors at a time

Robot Educator

- Step-by-step guide with 46 simple tutorials
- 39 programming tutorials
- 7 data logging tutorials
- Extensive help files
- Comprehensive digital user guide

Colours of and decorative designs on elements may vary.

LEGO MINDSTORMS education

Bring energy to your classroom

Let your students explore energy supply, transfer, accumulation, conversion and consumption at first hand through engaging, hands-on experiments. Combine the Renewable Energy Add-on Set with the LEGO® MINDSTORMS® Education range. Build more models and use the data logging capabilities of the NXT Software to carry out even more activities.

8+

9688

Renewable Energy Add-on Set

www 12 New

This new set is designed to be compatible with MINDSTORMS Education. It features a solar panel, blades, a motor/generator, LED lights, an extension wire and the unique LEGO Energy Meter, which works as a sensor when connected to the NXT. The Energy Meter collects the following data; input/output in volts, amps, watt, and energy storage level in joule. These data can be used for programming or viewed in the data logging window. Download free building instructions, activities and programming examples at MINDSTORMSeducation.com.

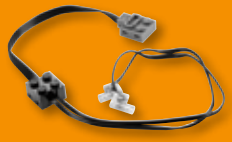
Building instructions included in the Add-on Set can be used as additional inspiration, but are designed for use with the 9686 set on page 12.


Solar Panel


Energy Meter


Blade


E-Motor


Lights

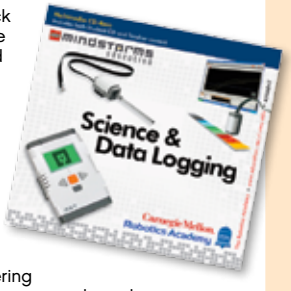

Extension Wire

11+

2009791

Science and Data Logging Activity Pack

www



This activity pack gives you four real-life science activities and one research project providing up to 25 hours of instruction. The activities are divided into four themes: Motion, Light and Color, Heat and Sound. The research project centers around data gathering and analysis for sensor-based inspection of aging bridges. Developed by Carnegie Mellon University's Robotics Academy, it includes video clips, worksheets and teacher introduction materials. NXT Temperature Sensor (9749) and NXT Software (2000080) are required.

- Measuring distance, time and speed using linear formulas
- Experimenting with light reflection and absorption
- Investigating properties of sound with focus on amplitude and frequency
- Experimenting with transfer of thermal energy by testing the effect of conduction, convection and radiation

Activity Pack 2009791


Connect


Construct


Contemplate


Continue

See activity examples at LEGOeducation.com

8+

9749

NXT Temperature Sensor

The temperature sensor is a digital sensor powered by the NXT brick. Using the NXT brick and NXT software (2000080), it can be calibrated to measure both Celsius and Fahrenheit (-20°C to +120°C/-4°F to +248°F).

9+

New

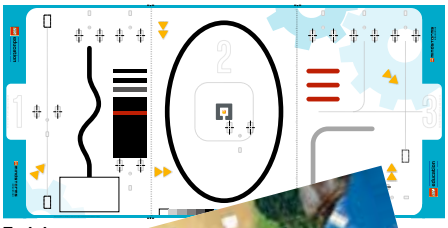
1365

9594

Green City Challenge Set

A theme-based set that guides students through LEGO MINDSTORMS building and programming in a structured way. It contains 2x3 training mats, 2x challenge mats 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.

- 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



Training

Get off to an easy start on robotics and competitions

The Green City Challenge is an easy way for newcomers to get started with robotics in the classroom. It is also ideal for preparing students, step by step, for robotics competitions. The activities cover both beginner and more advanced levels of building, programming and testing LEGO MINDSTORMS robots.

9+

New

www

2009594

Activity Pack for Green City Challenge Set

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.

- 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

Classroom Solutions

9797	2000080 + 2000078	9594 + 2009594	8887	9695
				
Starter Set		**Add-On**		
2-3 students	1x LEGO® MINDSTORMS® Education Base Set	1x LEGO® MINDSTORMS® Education Software	1x Green City Challenge Set + Activity Pack for Green City	1x Transformer	1x LEGO® MINDSTORMS® Education Resource Set
Classroom Set				
24 students	12x LEGO® MINDSTORMS® Education Base Set	1x LEGO® MINDSTORMS® Education Software + Site License	1x Green City Challenge Set + Activity Pack for Green City	12x Transformer	4x LEGO® MINDSTORMS® Education Resource Set

Colours of and decorative designs on elements may vary.

mindstorms education

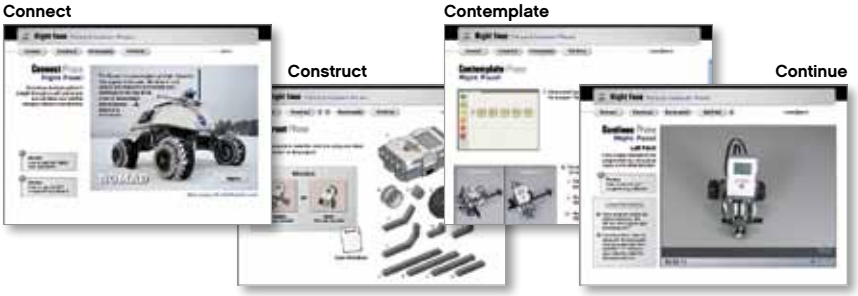
11+

WWW

2009797
Introduction to Robotics

Getting started in the classroom – this CD provides up to 24 hours of tuition divided up in 6 main projects and 3 end-of-project activities. Developed by Carnegie Mellon University's Robotics Academy, it is an easy to use step-by-step guide to robotics engineering using the MINDSTORMS Education hardware and software. Includes presentations and video clips, worksheets and teacher introduction materials. Teaching robotics can be extended to include theme-based projects, see 2009798.

Activity Pack 2009797



See activity examples at LEGOeducation.com

"LEGO® MINDSTORMS® Education is unique because it allows me to teach science and technology in a very rewarding way: If I want children to develop scientific enquiry skills and understand technological concepts, it's no good me just telling them how it is, or what to do. MINDSTORMS Education allows children to investigate, plan, test and implement their ideas – and in this way they work things out for themselves. This is very rewarding as a teacher. You see them enjoying themselves, getting results that they are happy with and answering problems that you have set them."

Simon Williams, Science and IT Teacher, New Lodge School, Dorking, England

11+

WWW

2009798
Robotics Projects: Themes

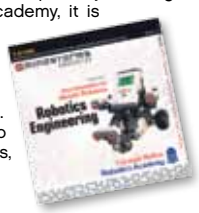
This CD provides 3 theme-based projects of up to 24 hours tuition in total. Developed by Carnegie Mellon University's Robotics Academy, the projects are based on the following real-life themes: Automated Mining, Sentry Guard Dog, and Automated Tree Measuring. Students work independently, using a variety of sources to expand their knowledge in order to design, build and program effective solutions. Includes advanced programming support. 2009798 is the next natural step for students who have completed the Introduction to Robotics, 2009797.

12+

WWW

2009787
Robotics Engineering Volume 1: Introduction to Mobile Robotics

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.



12+

WWW

2009788
Robotics Engineering Volume 2: Guided Research

This activity pack provides 3 comprehensive research projects of up to 60 hours tuition in total. Developed by Carnegie Mellon University's Robotics Academy, projects are based on real-life themes: Automated Mining, Sentry Guard Dog, and Automated Tree Measuring following an authentic Engineering guided research approach. Includes advanced programming support. 2009788 is the next natural step for students who have completed the Introduction to Mobile Robotics, 2009787.

Research
Robotics
Software
Explore
Classroom
Data Logging
Programming

ROBOLAB™

8+
2000069
ROBOLAB™ 2.9 Software

Icon-based programming

This latest upgrade to the ROBOLAB software platform allows users to communicate with both MINDSTORMS platforms, using the RCX or the NXT bricks. It is developed to aide existing ROBOLAB users migrate step-by-step from the RCX to the NXT platform. The software capability is equal to the 2.5.4 version of the software, with new features such as faster firmware and floating point math. The software pack includes PDF user manuals and resource materials. This software does not support Bluetooth™ communication to the NXT brick.

8+
2000096
ROBOLAB™ 2.9 Site Licence Agreement

The upgrade site license agreement allows ROBOLAB 2.9 software to be used on any compatible computer at the purchasing institution. Is necessary when installing the software on more than one computer. Requires pre-purchase of 2000069 ROBOLAB 2.9 Software.

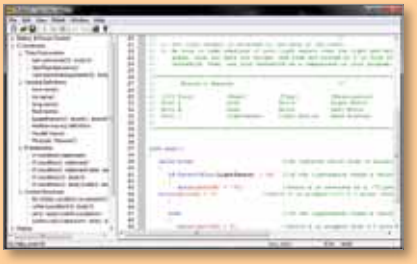
ROBOTC–Text-based Programming for LEGO® MINDSTORMS® Education

14+
2009781
Teaching ROBOTC for LEGO® MINDSTORMS®

WWW

This exciting activity pack includes more than 40 lessons for teaching text-based programming relating to engineering challenges for both the NXT and RCX platforms. Providing video-based instruction, the lessons cover the following topics: Movement, Sensing, Variables, Programming, Systems, and Advanced. Includes a set-up guide with software downloads, step-by-step instructions, and troubleshooting information. Requires use of the ROBOTC Software developed by Carnegie Mellon University.

Text-based programming



14+
2000081
ROBOTC Software Single License v.2.0

WWW

ROBOTC is a powerful C-based programming language with a Windows environment for writing and debugging programs, and the only programming language at this level that offers a comprehensive, real-time debugger. It allows students to learn the type of C-based programming used in advanced education and professional applications. ROBOTC is developed by the Carnegie Mellon Robotics Academy and designed for use with MINDSTORMS NXT and RCX as well as TETRIX.

14+
2000082
ROBOTC Software Classroom License v2.0

WWW

ROBOTC is a powerful C-based programming language with a Windows environment for writing and debugging programs, and the only programming language at this level that offers a comprehensive, real-time debugger. It allows students to learn the type of C-based programming used in advanced education and professional applications. ROBOTC is developed by the Carnegie Mellon Robotics Academy and designed for use with MINDSTORMS NXT and RCX as well as TETRIX. Classroom license allows for software installation on 12 computers.

LEGO mindstorms education

8+

9841
Intelligent NXT Brick

Programmable 32-bit brick, including Bluetooth™ wireless communication and USB port. Programmable dot matrix display. 4 input, 3 output ports. 6 wire digital platform. 8KHz loud speaker. It is possible to use a number of simple predefined commands directly on the brick. More advanced programming requires software pack 2000077/2000080. Requires 6 AA batteries or the 9798/9693 Rechargeable Battery.

8+

9842
Interactive Servo Motor

Servo Motor with in-built rotation sensor that measures speed and distance and reports back to the NXT. This allows for motor control within one degree of accuracy. Several motors can be aligned to drive at the same speed. You will need a connector cable, which is included in the 9797 Base Set.

8+

9843
Touch Sensor

Using the NXT brick, the touch sensor detects pressure – i.e. when the button is pressed or released. The sensor is also able to count single press and multiple presses. A LEGO cross axle can be attached to the sensor button. You will need a connector cable, which is included in the 9797 Base Set.

8+

9844
Light Sensor

Using the NXT brick, the light sensor is able to sense light or dark as well as light intensity in a room. It is also able to measure light intensity in colours (grey scale sorting). You will need a connector cable, which is included in the 9797 Base Set.

8+

9845
Sound Sensor

Using the NXT brick, the sound sensor is able to measure noise levels in DB and DBA. It can also recognize sound patterns and identify tone differences. You will need a connector cable, which is included in the 9797 Base Set.

8+

9846
Ultrasonic Sensor

Using the NXT brick, the ultrasonic sensor is able to detect an object and measure its proximity in inches and centimeters. You will need a connector cable, which is included in the 9797 Base Set.

8+

9694
Colour Sensor

New

Using the NXT brick, the Colour Sensor is able to perform three unique functions. It acts as a Colour Sensor distinguishing between six colours; it works as a Light Sensor detecting light intensities, both reflected light and ambient light; and it works as a Colour Lamp, emitting red, green or blue light. You will need a connector cable, which is included in the 9797 Base Set.

8+

9847
USB Bluetooth™ Dongle

The Abe USB Bluetooth adapter enables wireless communication between your PC or Mac and the NXT device. The Abe USB Bluetooth adapter is supported by Microsoft Windows XP, Vista (32 bit) and MacOS X 10.3.9 or newer, with the latest Service Packs.

8+

9693
Rechargeable Battery DC

Designed for use with the 9841 Intelligent NXT Brick, this Lithium Ion Polymer battery with DC plug gives you an alternative to normal AA batteries. Capacity: 2100 mAh. Estimated recharge time 4-5 hours. Use the 8887 Transformer 10V DC to charge.

8+

8887
Transformer 10V DC

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

8+

9799
Vernier NXT Sensor Adaptor

The Vernier NXT Sensor Adaptor allows you to integrate Vernier sensors with the Intelligent NXT brick and the NXT Software. This enables you to carry out an even wider variety of science experiments and data collection with your students. Embedded in a LEGO NXT sensor housing, the adaptor is very easy to assemble on NXT models.

More Opportunities with 3rd Party Products. Visit LEGOeducation.com!

A wide range of 3rd party products are available. They provide even more opportunities to carry out curriculum-relevant activities, experiments and data collection with LEGO® MINDSTORMS® Education. Visit LEGOeducation.com or contact your local dealer for more information.

HiTechnic

A trusted partner since 2006, HiTechnic manufactures a range of sensors for MINDSTORMS. Currently, seven sensors are available – all in MINDSTORMS sensor housing.

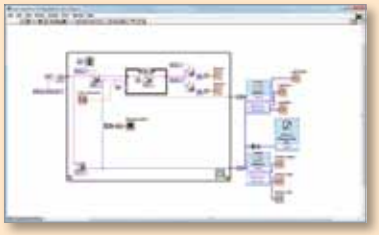
Vernier

The 9799 Vernier NXT Sensor Adaptor allows you to use more than 30 analogue Vernier sensors together with MINDSTORMS.

LogIt from DCP

With NXT LogIt Sensor Adaptor from DCP you can use more than 50 analogue and digital sensors with MINDSTORMS.

Icon-based programming



LabVIEW Education Edition

New

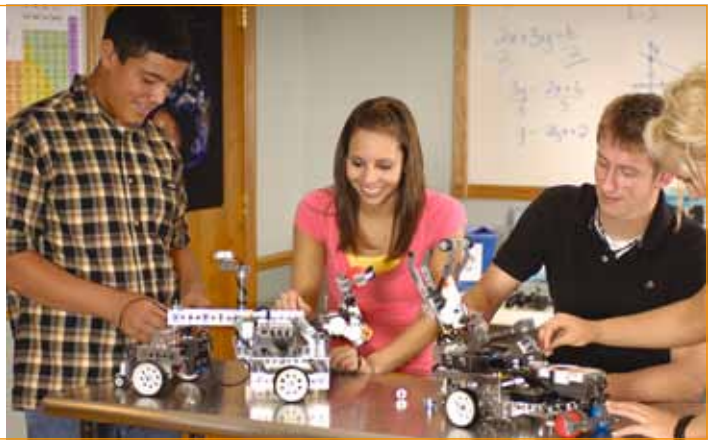
LabVIEW Education Edition is an intuitive, drag-and-drop programming environment that enables high school teachers to bring science, technology, engineering and math concepts to life. With LabVIEW, students can quickly build a program to log data, power a robot, and analyze information, while becoming familiar with the same graphical LabVIEW platform used in industry. The software works seamlessly with popular educational hardware including MINDSTORMS and TETRIX, and runs on both Windows and Mac OS.

TETRIX™ by PITSCO – Revolutionary Metal Building System for MINDSTORMS® Education

TETRIX™

TETRIX™ is a new metal building system designed for use with MINDSTORMS Education in higher education and *FIRST*® Tech Challenge competitions! It includes aluminium elements, metal gears, durable drive motors and servos, adding a new dimension to MINDSTORMS Education robots.

Visit LEGOeducation.com or contact your local dealer for more information.



education

ATTENTION!

If the artwork is subsequently changed beyond any text translation, all photos named Shutterstock xxx must either be excluded from the material or you must purchase the rights to use such photos directly from Shutterstock.com.

Classroom Solutions for Schools

LEGOeducation.com