



LEGO® Education 2021 Solution Guide



Hands-On Learning Wherever Learning Is Happening

With many schools around the world operating in a mix of virtual, hybrid and in-person environments, teachers are going to extraordinary lengths to support the social and emotional well-being of their students, while keeping them engaged in learning.

For over 40 years, LEGO® Education has been supporting teachers around the world to help foster a love of learning. LEGO Education hands-on solutions engage students in the wonder of learning through play, which naturally encourages exploration, inspires creativity, and creates meaningful connections to the concepts they are learning and with one another.

LEGO Education has pioneered a thoughtful progression of solutions that offer playful learning experiences for students of all ages and abilities to engage them in STEAM learning. We continue to expand our offering to include professional development training and coaching sessions to support teachers' evolving needs, and new lesson plans that guide teachers through hands-on STEAM lessons for every type of learning environment.

The world is changing in many ways. LEGO Education solutions help build confidence and resilience so that students can successfully navigate the changing world, now and in the future.

We look forward to helping you spark that love of learning, wherever learning is happening.

Happy building,



Esben Stærk
President of LEGO Education



What is LEGO® Education?

For more than 40 years LEGO® Education has offered engaging STEAM learning experiences for students in early learning, primary, and secondary education, as well as through after-school programs and competitions. Sparking creativity, collaboration and critical thinking, LEGO® Education solutions help educators create an environment where learners build resilience and confidence in learning through the power of purposeful play.

Hands-On LEGO® Learning

Each hands-on solution incorporates our five characteristics of playful learning experiences as identified by the LEGO® Foundation: joyful, actively engaging, socially interactive, iterative and meaningful.

Support and Resources

With comprehensive, standards-aligned lesson plans, getting started guides, teacher support and top-tier professional development opportunities, LEGO® Education solutions help educators engage students in STEAM topics whether learning happens in person or virtually.



EARLY LEARNING

Children are born with natural curiosity and creativity, and are eager to learn. Our Early Learning solutions help students understand the world around them by exploring topics like language and literacy, early math and science, physical coding, and social and emotional development. We use guided play and lessons developed using guidelines from national standards to help students ignite a passion for lifelong learning.

EARLY LEARNING

E



PRIMARY

The hands-on learning tools in this developmental level channel students' creativity and jump-start their STEAM engagement. Our Primary solutions are designed to introduce students to STEAM concepts while improving collaboration, communication, and problem-solving skills. Our lesson plans are aligned to national standards and provide learning opportunities across grades and STEAM subjects.

PRIMARY LEARNING

P



SECONDARY

Using smart bricks and digital tools, students at this developmental level can explore coding, programming, and engineering. Our Secondary solutions help students develop critical-thinking skills, expand their creativity, and explore real-life STEAM themes. Each engaging lesson plan is aligned to national standards.

SECONDARY LEARNING

S

The LEGO® Learning Solution

LEGO® Education believes that hands-on learning is an effective way to teach students of all levels skills like problem-solving, critical thinking, and more. Each solution is tailored to a specific grade level and designed to develop STEAM learning in a way that's both understandable and inspirational.

SKILLS ICONS



Science, Technology, Engineering, Art, Math



Coding



Social & Emotional Development



Early Language & Literacy



EARLY LEARNING

| LEARNING SOLUTIONS | BOOSTER SETS |
|---|--|
| STEAM Park My XL World Build Me "Emotions" StoryTales Coding Express Tech Machines | Tubes Letters Animals People Creative LEGO® DUPLO® Brick Set LEGO DUPLO Building Plates |



SKILLS

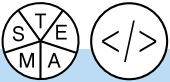


PRIMARY

SECONDARY

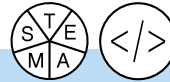
LEGO® EDUCATION WeDo 2.0

WeDo 2.0 Core Set



LEGO® EDUCATION SPIKE™ PRIME

LEGO® Education SPIKE™ Prime Set
LEGO Education SPIKE Prime Expansion Set



LEGO® MINDSTORMS® EDUCATION EV3

LEGO® MINDSTORMS® Education EV3 Core Set
EV3 Space Challenge Set
EV3 Expansion Set

LEGO® Education BricQ Motion Essential

BricQ Motion Essential Core Set



LEGO® Education BricQ Motion Prime

BricQ Motion Prime Core Set



PROFESSIONAL DEVELOPMENT



What Is a Solution?

When you invest in a LEGO® Education solution, you receive comprehensive unit plans, teacher support materials, opportunities for professional development, and endless possibilities for your classroom. To get even more out of your solution, you can purchase add-on components or replacement parts. Graphics like the ones below appear throughout this guide to help you figure out what comes standard in each solution and what can be added to it.

SOLUTION INCLUDES

CORE

A tailored brick set for building engaging, meaningful, hands-on learning experiences.

SOFTWARE

Easy-to-use software and apps for a range of devices.

UNIT PLAN

Subject-specific lessons and activities aligned to national standards.

TEACHER SUPPORT

Tools, rubrics, and teacher guides.

TECHNICAL SUPPORT

Online and phone support to address your inquiries or questions.

ADDITIONS

EXPANSION SETS & UNIT PLANS

Additional unit plans and brick expansion sets to help take the LEGO® Education experience to the next level.

PROFESSIONAL DEVELOPMENT

Facilitated product training with a LEGO Education certified trainer

Self-guided professional development

ACCESSORIES

Additional accessories are available to build on core and expansion sets.

REPLACEMENT PACKS









Replacement bricks are available just in case some of your original bricks go missing.





Contents

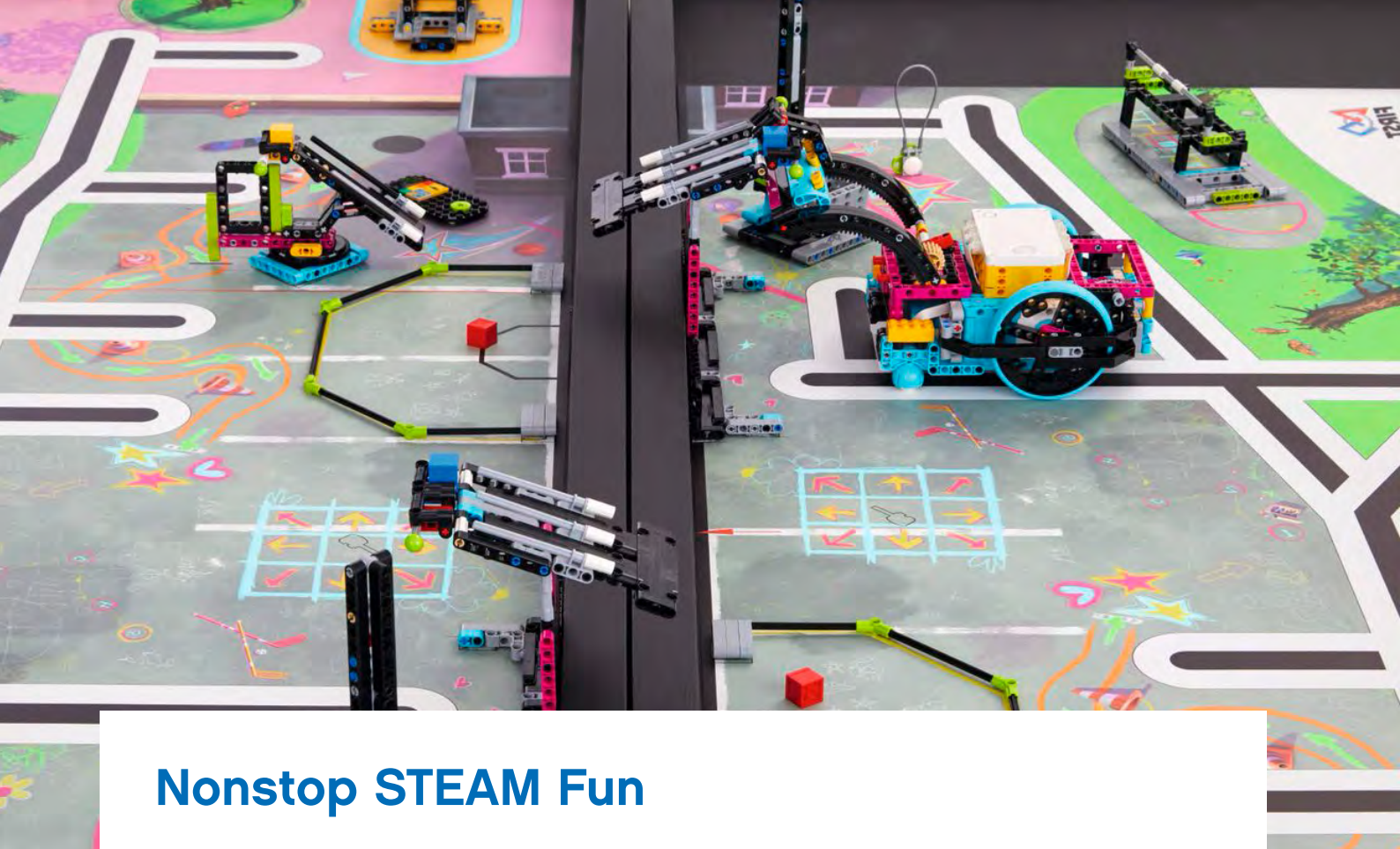
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|------------------------------------|----|
| WHAT IS LEGO® EDUCATION? | 4 |
| THE LEGO® LEARNING SOLUTION | 6 |
| COMPETITIONS | 10 |
| TRAINING AND ONGOING SUPPORT | 12 |
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| SECONDARY | 37 |



Icons

-  Recommended number of students per set
-  Total number of elements in a set
-  Storage box included
-  Suitable age range of set
-  Projects/activities/lessons in a unit plan
-  Duration of project/activity/lesson
-  Free website downloads
-  Free app available

-  Science, Technology, Engineering, Art, Math
-  Coding
-  Social & Emotional Development
-  Early Language & Literacy



Nonstop STEAM Fun

STEAM competitions are a highly motivating and engaging way for students to develop and showcase their science and technology skills. These competitions help students learn the cooperation, collaboration, and teamwork skills they'll need to be successful in a changing workforce. Throughout the strategic partnerships with *FIRST*[®], and as a premium partner of the World Robot Olympiad Association, LEGO[®] Education proudly develops and supports programs and events that bring these learning opportunities to students all over the world.



This worldwide robotics challenge gives young thinkers a chance to compete on a global scale. Students from more than 60 countries participate in four categories to solve specific challenges, construct solutions to thematic problems and create robots using LEGO[®] Education SPIKE[™] Prime Expansion Set, LEGO[®] MINDSTORMS[®] Education EV3 and LEGO Education WeDo 2.0 technology.

Get involved at: www.WRO-association.org

FIRST[®] and the *FIRST* logo are trademarks of For Inspiration and Recognition of Science and Technology (*FIRST*). LEGO, the LEGO logo, and MINDSTORMS are trademarks of the LEGO Group. *FIRST* LEGO League and *FIRST* LEGO League Jr. are jointly held trademarks of *FIRST* and the LEGO Group.

World Robot Olympiad[™] and the WRO[®] logo are trademarks of World Robot Olympiad Association Ltd. ©2021 World Robot Olympiad Association Ltd.



For children ages 4-6, this playful introductory STEM program ignites their natural curiosity and builds their habits of learning with hands-on activities in the classroom and at home using LEGO Duplo bricks.

Core Value: Learn STEM fundamentals

Key Benefit: Understanding the basics of STEM; Habits of learning



In Explore, teams of students ages 6-10 focus on the fundamentals of engineering as they explore real-world problems, learn to design and code, and create unique solutions made with LEGO bricks and powered by LEGO Education WeDo 2.0.

Core Value: Practice STEM concepts

Key Benefit: Understanding concepts & building STEM skills; Habits of learning



Friendly competition is at the heart of Challenge, as teams of students ages 9-16 engage in research, problem-solving, coding, and engineering – building and programming a LEGO robot that navigates the missions of a robot game. As part of Challenge, teams also participate in a research project to identify and solve a relevant real-world problem.

Core Value: Apply STEM skills

Key Benefit: Understand real-world uses of STEM; Applying critical thinking skills; Habits of learning

Learn more about the 3 program divisions at:
www.FIRSTLEGOLeague.org

Inspiring Generations of Global Citizens and Helping Them Realize Their Power to Build a Better Future



100+

Countries



2000+

Events



60.000+

Teams



504.000+

Participants

LEGO® Education Professional Development

A personalized learning program that inspires teachers to learn, practice and master competencies to facilitate playful hands-on STEAM learning. Engage actively in this experiential, personalized professional learning program designed to produce a strong set of transferable instructional skills and strategies. A selection of self-guided and facilitated learning is offered virtually and on-site.



Self-guided Learning

Free, online, on-demand, self-guided learning that targets individual needs and learning preferences. Get anytime anywhere access to:

- Interactive competency-based modules
- Product video tutorials
- LEGO Education learning philosophy

Facilitated Learning

Facilitated learning provides full-day training courses led by a LEGO Education certified trainer. These virtual or on-site courses are engaging learning experiences that build confidence and competence toward facilitating playful hands-on STEAM learning. Facilitated learning includes project-based learning courses and hands-on product training courses.



Learn more about Professional Development at www.LEGOeducation.com/PD



EARLY LEARNING

Build Confidence from Early On

Children are born curious and eager to learn. The purpose of LEGO® Education Early Learning is to stimulate that natural curiosity and encourage learning through play in the youngest children. Our aim is to help prepare them for school and life by building their social skills and allowing them to begin their STEAM journey early on – with opportunities to also strengthen emotional learning, literacy, as well as early engineering and coding skills.

SUPPORTING TEACHERS IN THE CLASSROOM

LEGO Education Early Learning is all about building confidence and preparing children for school and life. To achieve this, it is crucial that every teacher succeeds in using our learning solutions in the classroom. Therefore, we provide a range of teacher materials and inspiration.

SOLUTION INCLUDES

All solutions include:

CORE

A tailored LEGO® DUPLO® brick set for building engaging, meaningful, hands-on learning experiences.

TEACHER SUPPORT

Getting Started Cards
Inspiration Cards

TECHNICAL SUPPORT

The learning solutions also include:

UNIT PLANS

Lessons developed using guidelines from the National Association for the Education of Young Children (NAYEC), the 21st Century Early Learning framework (P21) and Head Start Early Learning Outcomes Framework.

SOFTWARE

Some of the learning solutions include a free, child-friendly app for an even more immersive experience.

ADDITIONS

PROFESSIONAL DEVELOPMENT

ACCESSORIES

REPLACEMENT PACKS



SCIENCE,
TECHNOLOGY,
ENGINEERING,
ART, MATH



EARLY CODING



SOCIAL &
EMOTIONAL
DEVELOPMENT



EARLY LANGUAGE
& LITERACY

“I love the moments when I catch the children using Early Learning sets from LEGO® Education to teach each other. It shows how empowered the LEGO Education solutions help them to feel. I absolutely love that.”

KATE LATHEM,
EARLY LEARNING TEACHER,
USA

Learning solutions

Start the STEAM learning and develop social skills



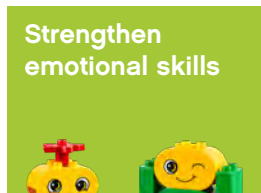
STEAM Park
Lessons: 8
Up to 8 children



My XL World
Lessons: 8
Up to 10 children

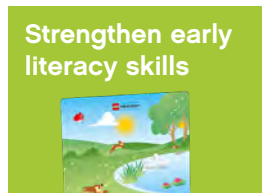


Focus on individual skills



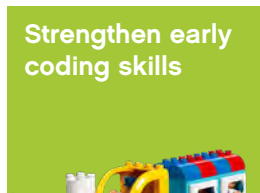
Strengthen emotional skills

Build Me "Emotions"
Lessons: 12
Up to 6 children



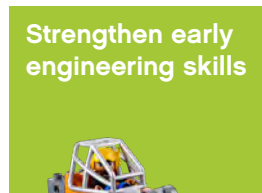
Strengthen early literacy skills

StoryTales
Lessons: 8
Up to 4 children



Strengthen early coding skills

Coding Express
Lessons: 8
Up to 6 children



Strengthen early engineering skills

Tech Machines
Lessons: 8
Up to 6 children



Booster Sets

Add fun with booster sets



Tubes

Letters

Animals

People

Creative LEGO® DUPLO® Brick Set

Building Plates

On the following pages, the individual learning solutions and booster sets will be explained in more detail →



LEARNING SOLUTION - FOCUS ON SOCIAL SKILLS

My XL World

45028

My XL World is designed to develop children's social skills and deepen their understanding of the world around them through role play, fun building activities and idea sharing.

This learning solution will build children's confidence and essential social skills such as collaboration, communication, and understanding roles and responsibilities.

- Online unit plan with eight lessons
- Full-day professional development course as add-on
- Inbox material:
 - 480 LEGO® DUPLO® bricks, including wheel bases, windows, doors, flowers, and six DUPLO figures
 - Getting Started activity card
 - 10 double-sided inspiration cards with 20 models to build

KEY LEARNING VALUES

Collaboration

Role play

Roles and responsibilities





LEARNING SOLUTION - FOCUS ON EMOTIONAL SKILLS

Build Me “Emotions”

45018

Build Me “Emotions” invites preschoolers to explore emotions and physical characteristics in a fun and engaging way.

As children collaborate on a range of character-building experiences, they recognize feelings and identify similarities and differences. Inspirational building cards provide support and inspiration so children can continue to build and rebuild characters again and again.

- Online unit plan with 12 lessons
- Full-day professional development course as add-on
- Inbox material:
 - 188 LEGO® DUPLO® bricks including unique elements with various facial expressions
 - Getting Started activity card
 - 8 double-sided inspiration cards

KEY LEARNING VALUES

Vocabulary

Self-efficacy

Empathy

Problem-solving



LEARNING SOLUTION - FOCUS ON EARLY LITERACY SKILLS

Story Tales

45005

Promote creativity, imaginative storytelling, and language development with this unique and engaging storytelling set. Children will naturally collaborate and develop speaking and listening skills as they build their stories and role-play. Anyone can tell a story with StoryTales!

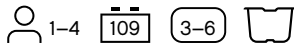
- **Online unit plan with eight lessons**
- **Full-day professional development course as add-on**
- **Inbox material:**
 - 109 LEGO® DUPLO® bricks including 3 base plates for storytelling and unique bricks and characters
 - Getting Started activity card
 - 5 double-sided background cards

KEY LEARNING VALUES

Storytelling

Speaking and listening

Language and literacy



SYSTEM REQUIREMENTS

Coding Express supports a range of Android and iOS devices. To find out if your device is supported, please visit:

[LEGOeducation.com/start](https://www.legoeducation.com/start)

ACTION BRICKS



KEY LEARNING VALUES

Sequencing, looping, and conditional coding
 Expressing ideas using digital elements
 Language and literacy
 Collaboration
 Problem-solving and critical thinking

LEARNING SOLUTION - FOCUS ON EARLY CODING SKILLS

Coding Express

45025

Coding Express is a creative and intuitive solution that introduces preschoolers to early coding and critical 21st century skills, while naturally sparking their curiosity, creativity and desire to explore and learn together. Based on the ever-popular train theme, this highly versatile solution allows children to make connections and intuitively explore early coding concepts such as sequencing, looping, and conditional coding while developing problem-solving skills, critical thinking, and collaboration.

- Online unit plan with eight lessons
- Full-day professional development course as add-on
- App with four areas for further exploration: Journeys, Characters, Music, and Math
- **Inbox material:**
 - 234 LEGO® DUPLO® bricks including Push & Go train with lights and sounds, motor, color sensor that interacts with 5 colored action bricks, and 2 railroad switches
 - Getting Started activity card
 - 6 double-sided inspiration cards

1-6 234 2-5 ↓



LEARNING SOLUTION - FOCUS ON EARLY ENGINEERING SKILLS

Tech Machines

45002

Transform preschoolers into expert builders! The Tech Machines solution is an engaging solution for preschool children who are ready to explore and develop early engineering skills. With Tech Machines in the classroom, children will develop their fine-motor and problem-solving skills while simultaneously unleashing their creativity as they construct classic machines.

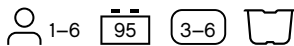
- Online unit plan with eight lessons
- Full-day professional development course as add-on
- **Inbox material:**
 - 95 LEGO® DUPLO® bricks including 4 screwdrivers and many unique elements
 - Getting Started activity card
 - 6 inspiration cards

KEY LEARNING VALUES

Fine-motor skills

Problem-solving

Engineering





BOOSTER PACK**Tubes****45026**

Inspire early learners to develop their 21st century skills as they explore a world of fun animals made from tubes and other colorful LEGO® DUPLO® elements.

Inbox material:

- 150 DUPLO elements, including colorful tubes, bricks, 6 balls, doors, and baskets
- Getting Started card
- 6 inspiration cards to create fun buildable animals



1-6  

**BOOSTER PACK****Letters****45027**

Explore early literacy skills through play and nurture children's confidence as they play and learn in an alphabet world of LEGO® DUPLO® bricks and inspiring activities.

Inbox material:

- 130 DUPLO elements, including a wide selection of bricks with English letters of the alphabet in a rainbow of colors
- Getting Started card
- 4 double-sided inspiration cards

1-4  





**BOOSTER PACK****Animals****45029**

Let early learners explore the world of animals with an inspiring collection of colorful LEGO® DUPLO® animal figures and accessory elements.

Inbox material:

- 91 DUPLO elements, including a collection of 40 wild animals, farm animals and pets, such as an elephant, polar bear, whale, and fish
- Getting Started card
- 4 double-sided inspiration cards

1-4  91  2-6

**BOOSTER PACK****People****45030**

Let preschoolers explore the people that make up families, communities and cultures with LEGO® DUPLO® figures, accessory elements, and playful learning ideas.

Inbox material:

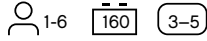
- 44 elements, including 26 DUPLO figures that introduce preschoolers to a wide variety of people and occupations that make up families, relationships and communities
- Getting Started card
- 4 double-sided inspiration cards

1-4  44  2-6

Additional Products

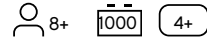
Creative LEGO® DUPLO® Brick Set

45019



Creative LEGO® Brick Set

45020



Accessories

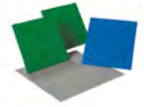
4+ *Unless noted*

Large LEGO® Building Plates



9286

Includes one gray 38 x 38 cm, two green 25 x 25 cm, and one blue 25 x 25 cm building plates.



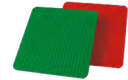
Large LEGO® DUPLO® Building Plates



1.5+

9071

38 x 38 cm. One red, one green. LEGO® DUPLO®.



Storage

5+ *Unless noted*

Large Storage Solution

1.5+

9840

Comes in packs of six, with drainage holes and transparent lids. Stack easily.



Small Storage

45497

Comes in packs of seven with transparent lids. Stack easily. Similar in size to the WeDo 2.0 storage box.



Medium Storage

45498

Comes in packs of eight with transparent lids. Stack easily. Similar in size to the Simple & Powered Machines and LEGO® MINDSTORMS® Education EV3 storage box.



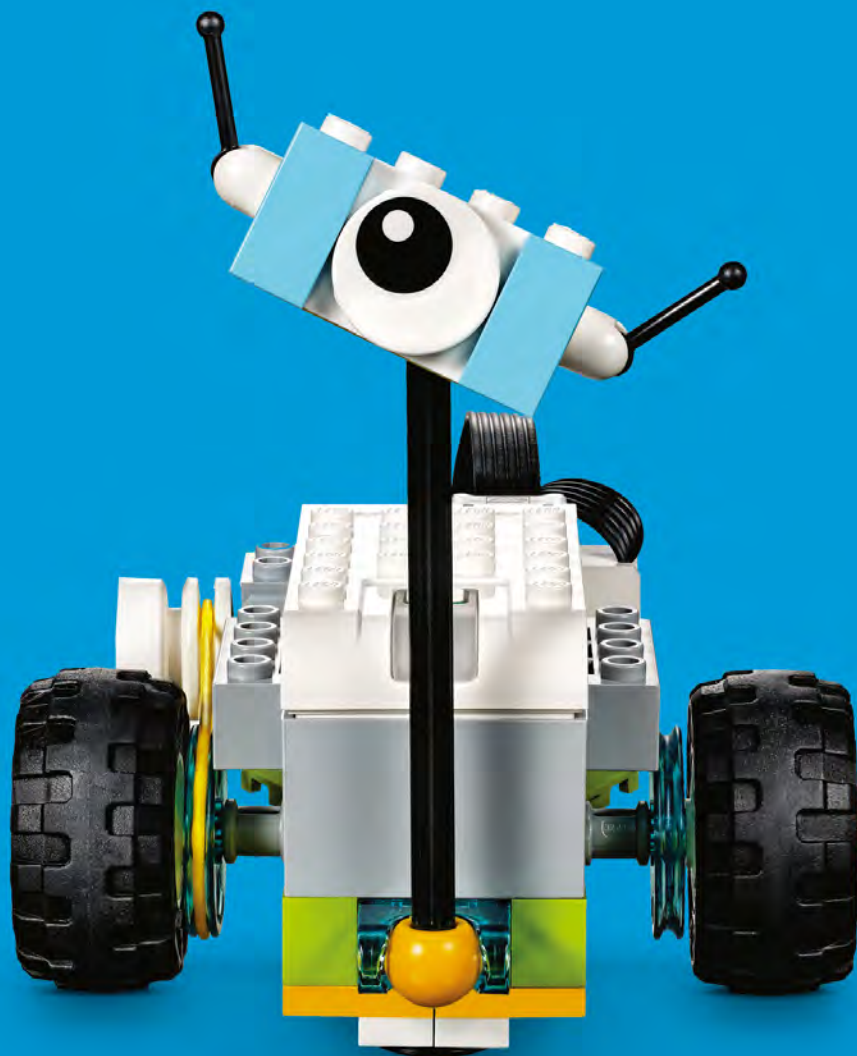
Sorting Top Tray

45499

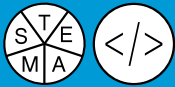
Comes in packs of 12. Fits small (45497), medium (45498), and large (9840) LEGO® Education storage boxes.



Please contact your local distributor for information on classroom bundles.



PRIMARY



STEAM
CODING

BLUETOOTH® LOW ENERGY

WeDo 2.0 integrates the latest Bluetooth® technology to let students take “live” control of the models they create for near-instantaneous responses. To ensure the best possible WeDo 2.0 experience, desktops, laptops, and tablet devices must meet a minimum set of system requirements.

SYSTEM REQUIREMENTS

WeDo 2.0 supports a range of Windows, Mac, Chromebook, iOS, and Android devices. To find out if your device is supported, please visit:

LEGOeducation.com/start

LEGO® EDUCATION WeDo 2.0

Making STEAM Come to Life

At its core, science isn't about lab coats and research papers. It's about asking questions and investigating the answers. It's about wonder.

WeDo 2.0 encourages students to put those aspects of scientific discovery to work by solving real STEAM problems. Using LEGO® bricks, sensors, and motors, students can use this solution to ignite their creativity, develop critical-thinking skills, explore career possibilities, and simply get hands-on STEAM experience. This set helps make abstract engineering and science concepts concrete, and improves students' collaboration, problem-solving, and computational thinking skills.

SOLUTION INCLUDES

CORE & SOFTWARE

WeDo 2.0 CORE SET

WeDo 2.0 SOFTWARE

UNIT PLANS

WeDo 2.0 SCIENCE & ENGINEERING

WeDo 2.0 COMPUTATIONAL THINKING

WeDo 2.0 MAKER

SUPPORT

WeDo 2.0 TEACHER GUIDES

GETTING STARTED TUTORIALS

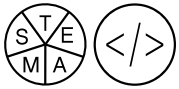
PLUS: ASSESSMENT TOOLS & TECHNICAL SUPPORT

ADDITIONS

ACCESSORIES & REPLACEMENT PACKS

TRAINING & PROFESSIONAL DEVELOPMENT





STEAM
CODING

GETTING STARTED



Get started with four quick-and-easy activities.



Build your LEGO® model and connect it to your device.



Build your own code by putting programming blocks together.



Press the play block to bring your model to life.

CORE & SOFTWARE

WeDo 2.0 Core Set

45300

The LEGO® Education WeDo 2.0 Core Set is a hands-on solution that helps teach STEAM concepts in an engaging, discovery-based way. Designed with collaboration in mind, this set combines LEGO bricks with classroom-friendly software to introduce students to science, engineering, and computational principles.

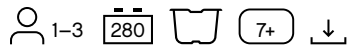
KEY LEARNING VALUES

Investigating, modeling, and designing solutions

Engaging students in science by making it real and relevant

Basic programming skills, critical thinking, and problem-solving

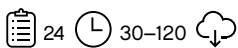
Collaboration and presentation skills



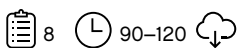
Product packaging may vary. Product remains the same.

UNIT PLANS**WeDo 2.0 Science & Engineering**

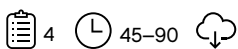
Built on the latest science standards, this unit plan promotes investigation and experimentation in life, physical, earth, and space sciences. This unit plan gives teachers an engaging, hands-on way of introducing engineering, technology, and computing projects.

**WeDo 2.0 Computational Thinking**

Computational thinking is a way of solving problems computationally. This unit plan promotes skills such as distilling problems into smaller tasks, performing actions in the right order, evaluating solutions, and communicating ideas in simple and creative ways.

**WeDo 2.0 Maker**

This unit plan combines the STEAM elements of WeDo 2.0 with the creative freedom of Maker. These open-ended activities invite students to question, create, tinker, make, innovate, and remake again while exploring early coding and more.

**THEME**

WeDo 2.0 allows students to explore and develop solutions to real-life problems.

**CODE**

Block-based coding helps students understand how to combine the digital and physical aspects of the world.

MOTION

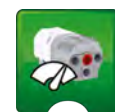
By experimenting with gears and motors, students can explore the science behind motion.

CODE CONFIDENTLY

Build your own code by putting programming blocks together. Different shapes and colors have different actions that help teach students how to build behaviors into their own models.

**FLOW BLOCKS**

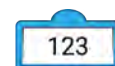
These blocks tell the program to start, stop, wait, or repeat.

**OUTPUT BLOCKS**

These blocks define the outcome—like motor action, sound, light, or display.

**INPUT BLOCKS**

These blocks define the input, such as sensor, sound, or text.





FIRST® and LEGO® Education Tackle COVID-19 Challenges with Remote Event Hub

We asked Kim Wierman, Director of FIRST® LEGO® League at FIRST, how the program is converting to remote events in response to the COVID-19 pandemic, and how it ensured that students can still participate in an immersive experience.

Participating in a competition is a very important (and fun!) part of FIRST® LEGO® League. Students in our program not only get to demonstrate their hard work, but also get to celebrate their accomplishments and interact with other participants in an energized environment. Our events play an important role, but the COVID-19 pandemic has forced us to creatively reimagine what a FIRST LEGO League competition looks like in a hybrid or remote set-up. We have worked hard to recreate important aspects of the competition facilitated through a new platform – the FIRST Remote Event Hub presented by LEGO Education and the LEGO Foundation – that allows the teams to upload their Robot Game matches for referees to review and present their Innovation Project and Robot Design in an online judging session. We've also factored in the facilitation of opening and closing ceremonies, so the recognition moments

can be celebrated among teams and their families. This new platform retains important educational elements of the program while keeping students and volunteers safe. Prior to any competition or judging, teams are still able to collaborate online, in-person in small groups where circumstances allow, or in a hybrid situation. The guided materials for students and their coaches are designed for teams divided into smaller groups to complete activities, which allows for cleaning materials before passing them to the next group to use. In addition, we've created activities that can be done at home to facilitate family engagement in what the students are working on.

Besides guidance on social distancing and good hygiene in handling of materials, our stringent youth protection practices extend to creating a safe online environment. Top child safety and data protection experts from both FIRST and the LEGO Group have collaborated in the creation of the Remote Event Hub.

Our 2021 Season and Challenge are just getting started. Now is a great time to join! Learn more at www.firstinspires.org/robotics/fll





STEAM

“The lessons were really enjoyable – kids loved them, I enjoyed teaching them and the students did a really nice job of collaborating together, building together and they really got the concepts in the end.”

**3RD GRADE TEACHER
BARRINGTON, ILLINOIS**

Learn more about
BricQ Motion Essential at:

**LEGOeducation.com/
bricq-motion-essential**

LEGO® EDUCATION BricQ MOTION ESSENTIAL

Encourage Students to Discover Physical Science in Action

LEGO® Education BricQ Motion Essential engages primary school students in STEAM learning as they experiment with forces, motion and interactions in the context of sports. BricQ Motion Essential helps foster an understanding of physical science by providing easy, hands-on learning experiences without the need for technology. Students will experience cool “aha” moments as they set bricks in motion.

SOLUTIONS INCLUDE

CORE

BricQ MOTION ESSENTIAL SET

UNIT PLANS

TRAIN TO WIN (LOWER PRIMARY)

WINNING WITH SCIENCE (UPPER PRIMARY)

SUPPORT

GETTING STARTED MATERIAL

LESSON PLANS

ASSESSMENT TOOLS

SELF-GUIDED PROFESSIONAL DEVELOPMENT

ADDITIONS

PROFESSIONAL DEVELOPMENT

FACILITATED PRODUCT TRAINING WITH A LEGO EDUCATION CERTIFIED TRAINER

LEARNING CAN HAPPEN ANYWHERE

USED IN COMBINATION WITH THE BricQ MOTION CLASSROOM SET, PERSONAL LEARNING KITS CAN FACILITATE LEARNING WHEREVER IT HAPPENS — IN THE CLASSROOM OR REMOTELY.

CORE

LEGO® Education BricQ Motion Essential Set

45401

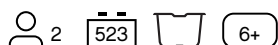
This 523-piece set includes a variety of easy-build elements, gears, weight bricks, springs, 4 minifigures and more, while color-coded sorting trays ease the building process and make tidying up at the end of class quick and efficient. Replacement elements are also included, as well as 2 printed building instruction booklets with inspirational ideas that help students discover physical science in action, even those who have never built with LEGO bricks before.

KEY LEARNING VALUES

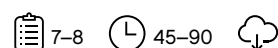
Investigate push and pull forces and use evidence to solve problems.
Apply scientific inquiry skills to show how the forces acting on an object can change its motion.

Practice application of cause and effect & balanced and unbalanced forces to design, develop and optimize a solution.

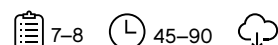
Strengthen oral communication skills as students participate in collaborative conversations to present their ideas.

**UNIT PLAN, LOWER PRIMARY****Train to Win**

This unit will give your students an understanding of forces and motion as they plan and conduct investigations about the cause and effect of push and pull forces. These seven lessons will introduce students to the process of asking and answering questions, data analysis and how to present their ideas.

**UNIT PLAN, UPPER PRIMARY****Winning with Science**

This unit will develop your students' understanding of forces and motion as they engage in and conduct investigations about the effects of balanced and unbalanced forces. They'll investigate the patterns in an object's motion, developing and sharpening their ability to predict future motion.



Additional Components

7+ *Unless noted*

Transformer 10V DC

8+

45517

This standard 10V DC transformer allows you to recharge the Rechargeable Battery DC (9693), the EV3 Rechargeable DC Battery (45501), the Power Functions Rechargeable Battery Box (8878), and the Smarthub Rechargeable Battery (45302).



Smarthub Rechargeable Battery

45302

Rechargeable lithium ion battery for the WeDo Smarthub 2 i/o (45301). Includes a built-in LED to indicate charge status.



Smarthub 2 i/o

45301

Enables the WeDo sensors and motors to come to life. Using the WeDo 2.0 software and Bluetooth® Low Energy (BTLE) technology, the two-port Smarthub transmits data between a tablet or desktop computer and the WeDo 2.0 Core Set.



Medium Motor

45303

This medium-size, medium-power motor has 2x2 studs on the top and a snap interface on the front to allow easy and optimized integration with the WeDo 2.0 Core Set elements. No setup is required.



Motion Sensor

45304

Attach the Motion Sensor to the WeDo 2.0 Smarthub and it can detect objects within a range of 15 cm. No setup is required.



Tilt Sensor

45305

Attach the Tilt Sensor to the WeDo 2.0 Smarthub and it can detect seven different types of orientation: Tilt This Way, Tilt That Way, Tilt Up, Tilt Down, No Tilt, Any Tilt, and Shake. No setup is required.



Replacement Packs

Replacement Pack WeDo 2.0

8+

2000715

Don't let a missing piece spoil your enjoyment of WeDo 2.0. This Replacement Pack includes 109 elements for the LEGO® Education WeDo 2.0 Core Set (45300).



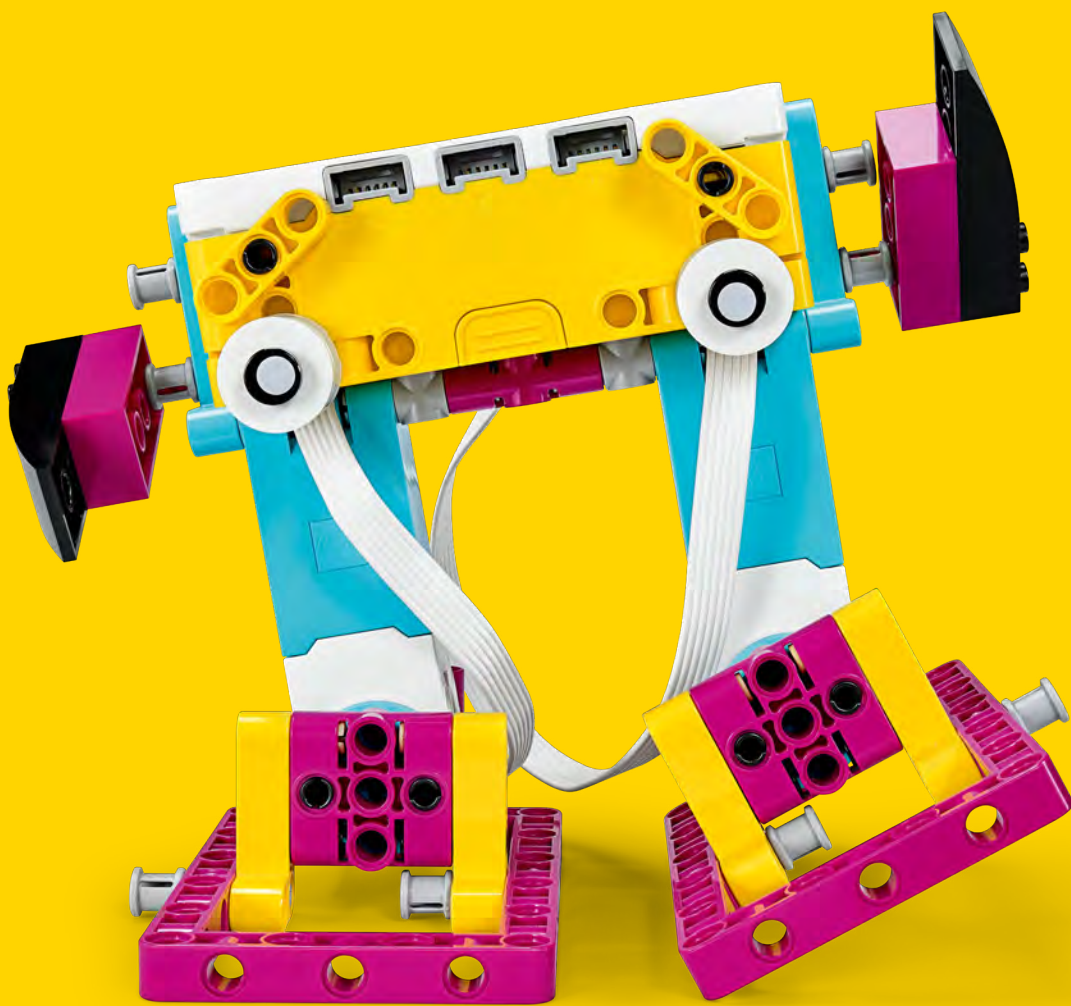
LE Replacement Pack Rubber Bands

2000707

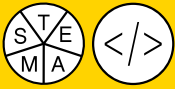
This pack features eight rubber bands in white, red, blue, and yellow for the LME EV3 Expansion Set (45560), LME Base Set (9797), LME Resource Set (9695).



Please contact your local distributor for information on classroom bundles.



SECONDARY



STEAM
CODING

CODE CONFIDENTLY

The intuitive coding environment for tablets and computers is based on the popular coding language Scratch, creating a system that teachers and students will love.



SYSTEM REQUIREMENTS

LEGO® Education SPIKE™ Prime utilizes the coding language based on Scratch with your choice of operating system: iOS, Chrome, Windows 10, Mac and Android. To find out if your device is supported, please visit:

LEGOeducation.com/start

LEGO® EDUCATION SPIKE™ PRIME

Building STEAM Skills and Confidence in Secondary School

As educators around the world address the disruption to students' learning, it is even more important to provide meaningful learning experiences that help build resilience. LEGO® Education SPIKE™ Prime solutions and lesson plans have been purposefully designed to increase student engagement and confidence for all learners. Easily adaptable to fit any learning environment, SPIKE Prime builds critical thinking, resilience and independence - essential skills for the future. SPIKE Prime is an intuitive hands-on solution designed to develop students' confidence in STEAM concepts via learning through play.

SOLUTION INCLUDES

SET & APP

LEGO® EDUCATION SPIKE™ PRIME SET

LEGO® EDUCATION SPIKE™ APP

UNIT PLANS

INVENTION SQUAD

KICKSTART A BUSINESS

LIFE HACKS

TRAINING TRACKERS

SUPPORT

GETTING STARTED MATERIAL

LESSON PLANS

ASSESSMENT TOOLS

SELF-GUIDED PROFESSIONAL DEVELOPMENT

ADDITIONS

EXPANSION SET

LEGO® EDUCATION SPIKE™ PRIME EXPANSION SET

UNIT PLANS

COMPETITION READY

ACCESSORIES & REPLACEMENT PACKS

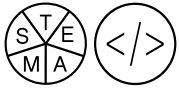
PROFESSIONAL DEVELOPMENT

FACILITATED PRODUCT TRAINING WITH A LEGO EDUCATION CERTIFIED TRAINER

LEARNING CAN HAPPEN ANYWHERE

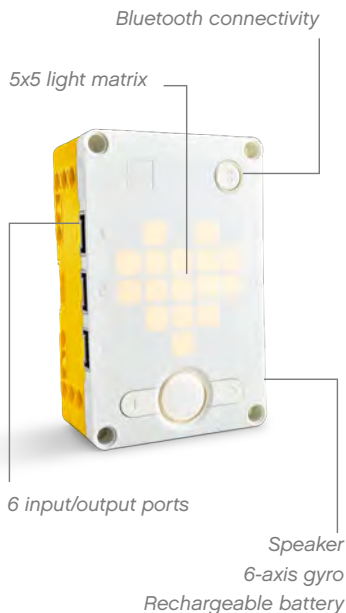
USED IN COMBINATION WITH THE SPIKE PRIME CLASSROOM SET, PERSONAL LEARNING KITS CAN FACILITATE LEARNING WHEREVER IT HAPPENS - IN THE CLASSROOM OR REMOTELY



STEAM
CODING

THE HUB

The heart of the LEGO® Education SPIKE™ Prime system is the programmable Hub. The SPIKE Prime Set also includes highly accurate motors and sensors that, together with a large variety of colorful LEGO building elements, let students design and build fun robots, dynamic devices and other interactive models. Many attachment points on the Hub, motors and sensors plus new, large building elements means students spend less time building and more time learning.



SET

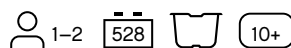
LEGO® Education SPIKE™ Prime Set

45678

The LEGO® Education SPIKE™ Prime Set is the go-to STEAM learning tool for grade 6-8 students. Combining colorful LEGO building elements, easy-to-use hardware, and an intuitive drag-and-drop coding language based on Scratch, SPIKE Prime continuously engages students through playful learning activities to think critically and solve complex problems, regardless of their learning level. From easy-entry projects to limitless creative design possibilities, including the option to explore text-based coding with Python, SPIKE Prime helps students learn the essential STEAM and 21st century skills needed to become the innovative minds of tomorrow... while having fun!

KEY LEARNING VALUES

Apply engineering design skills at each step of the design process.
Develop efficient problem-solving and coding skills through decomposition of problems and algorithmic thinking.
Design projects that combine hardware and software components to collect and exchange data.
Work with variables, data arrays and cloud data.
Apply critical thinking and develop life skills for the careers of tomorrow.
Construct, analyze, and interpret graphical displays of data to describe the relationships between types of energy.



APP**Intuitive app scales from easy-entry to limitless creative design**

In addition to a Getting Started Material, the LEGO® Education SPIKE™ App comes with 4 learning units of curriculum-aligned STEAM content focusing on Engineering and Computer Science. Designed for students grades 6-8 and optimized for 45-minute lessons, these units accelerate STEAM learning by consistently engaging students to think critically and to solve complex problems, regardless of their learning level.

EXPANSION SET**LEGO® Education SPIKE™ Prime Expansion Set****45680**

Enter the exciting world of robotics competitions with the LEGO® Education SPIKE™ Prime Expansion Set (45680). With 603 elements, including large wheels, banana gears, a color sensor and a large motor, this add-on to the SPIKE Prime Set (45678) features over 10 hours of targeted STEAM learning that will inspire 6th to 8th grade students and teachers to build more advanced models and prepare them for the fun and challenging world of robotics competitions.

KEY LEARNING VALUES

Learn the basics of creating and programming autonomous robots using sensors.
Develop collaboration and teamworking skills to build a competition robot.
Systematically test and refine programs.
Use problem-solving skills and complete competition missions.
Apply critical thinking and develop life skills for the careers of tomorrow.

REQUIRES ADDITIONAL PRODUCTS

LEGO® Education SPIKE™ Prime Set (45678), see page 40.

603 10+

**GETTING STARTED****START HERE** ⌚ 5

Connect the Hub and create a LEGO emoji.

MOTORS AND SENSORS ⌚ 30

Explore action-reaction.

MAKE IT MOVE ⌚ 30

Build and code.

UNIT PLANS ⌚ 45-90**SPIKE PRIME SET****INVENTION SQUAD** 📄 5

Explore engineering.

KICKSTART A BUSINESS 📄 6

Investigate computer science.

LIFE HACKS 📄 7

Practically apply data.

TRAINING TRACKERS 📄 7

Graph and analyze data.

SPIKE PRIME EXPANSION SET**COMPETITION READY** 📄 8

Use curiosity and teamwork.



FIRST® and LEGO® Education Tackle COVID-19 Challenges with Remote Event Hub

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Our 2021 Season and Challenge are just getting started. Now is a great time to join! Learn more at www.firstinspires.org/robotics/fli



STEAM

“I think whether it’s your first year teaching or your 20th year, the lessons are very easy to follow. What I liked most was that even without being a science teacher, I could easily see the connection to the science curriculum.”

**6TH GRADE TEACHER
NAPERVILLE DISTRICT,
ILLINOIS, USA**

Learn more about
BricQ Motion Prime at:

**[LEGOeducation.com/
bricq-motion-prime](https://LEGOeducation.com/bricq-motion-prime)**

LEGO® EDUCATION BricQ MOTION PRIME

Encourage Students to Discover Physical Science in Action

LEGO® Education BricQ Motion Prime engages secondary students in STEAM learning as they experiment with forces, motion, and interactions in the context of sports. BricQ Motion helps foster an understanding of physical science by providing easy, hands-on learning experiences without the need of technology. Students will experience cool “aha” moments as they set bricks in motion.

SOLUTIONS INCLUDE

CORE

BricQ MOTION PRIME SET

UNIT PLANS

SCIENCE OF SPORTS

SUPPORT

GETTING STARTED MATERIAL

LESSON PLANS

ASSESSMENT TOOLS

SELF-GUIDED PROFESSIONAL DEVELOPMENT

ADDITIONS

PROFESSIONAL DEVELOPMENT

FACILITATED PRODUCT TRAINING WITH A LEGO EDUCATION
CERTIFIED TRAINER

LEARNING CAN HAPPEN ANYWHERE

USED IN COMBINATION WITH THE BricQ MOTION CLASSROOM
SET, PERSONAL LEARNING KITS CAN FACILITATE LEARNING
WHEREVER IT HAPPENS — IN THE CLASSROOM OR REMOTELY

CORE

LEGO® Education BricQ Motion Prime Set

45400

This 562-piece set includes an extensive selection of special elements such as gears, wheels, balls, weights and pneumatics, 4 minifigures and more, while color-coded sorting trays ease the building process and make tidying up at the end of class quick and efficient. Replacement elements are also included, as well as printed building instructions with inspirational ideas that help students discover physical science in action.

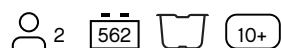
KEY LEARNING VALUES

Investigate push and pull forces and use evidence to solve problems.

Apply scientific inquiry skills to show how the forces acting on an object can change its motion.

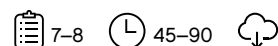
Practice application of cause and effect & balanced and unbalanced forces to design, develop and optimize a solution.

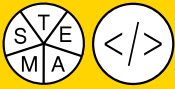
Strengthen oral communication skills as students participate in collaborative conversations to present their ideas.

**UNIT PLAN, SECONDARY**

Science of Sports

In this unit, your students apply their scientific inquiry skills as they provide evidence on the change in an object's motion based upon its force and mass. Your students will practice their application of Newton's laws to design, develop and optimize a solution that involves the collision of two objects. Your students strengthen their oral communication skills as they present and analyze solutions in collaborative discussions.





STEAM
CODING

“STEM is important for a ton of reasons. Mostly having to do with the grit that it instills in kids who actually try.”

MARK McCOMBS
FOUNDER OF RENAISSANCE
JAX, AND TEDx TALK SPEAKER,
JACKSONVILLE, FLORIDA

SYSTEM REQUIREMENTS

LEGO® MINDSTORMS® Education EV3 utilizes Python text-based programming and block-based programming based on Scratch with your choice of operating system: iOS, Chrome, Windows 10, Mac and Android. To find out if your device is supported, please visit:

LEGOeducation.com/start

LEGO® MINDSTORMS® EDUCATION EV3 Bringing Best-in-Class STEM and Robotics Tools to the Classroom

LEGO® MINDSTORMS® Education EV3 is a hands-on, cross-curricular STEM solution that combines LEGO Technic™ elements, classroom-friendly software, and standards-aligned lessons to spark creative confidence and critical thinking. This solution tackles subjects like engineering, coding, and physics with intuitive guides and smart bricks, and puts real-life STEM topics right at students' fingertips.

SOLUTION INCLUDES

CORE & SOFTWARE

EDUCATION EV3 CORE SET
VISUAL STUDIO CODE WITH EV3 MICROPYTHON EXTENSION
PLUS: OTHER SOFTWARE - EV3 CLASSROOM

UNIT PLANS

EV3 COMPUTER-INTEGR. MANUFACTURING
EV3 REAL-WORLD VEHICLES

SUPPORT

GETTING STARTED MATERIAL
EV3 TEACHER GUIDES
ASSESSMENT TOOLS & TECHNICAL SUPPORT

ADDITIONS

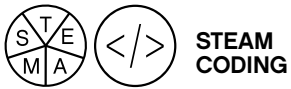
EXPANSION SETS

EV3 SPACE CHALLENGE SET
EV3 EXPANSION SET

ACCESSORIES & REPLACEMENT PACKS

TRAINING & PROFESSIONAL DEVELOPMENT





GETTING STARTED



Set up by installing software, unboxing and sorting bricks, and powering up the EV3 Brick.



Learn the basics by connecting and building your first program.



Start creating and controlling your robot.

CORE

LEGO® MINDSTORMS® Education EV3 Core Set

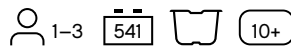
45544

The LEGO® MINDSTORMS® Education EV3 Core Set is the ideal STEM learning and robotics tool for high school students (grades 9-12). Comprising the powerful Intelligent EV3 Brick and a selection of advanced motors, sensors and LEGO elements, students learn text-based programming with MicroPython, a version of one of the world's most popular programming languages. They can also learn to program with the free EV3 Classroom app, featuring a coding language based on Scratch. With this powerful combination of engaging hardware and software, students develop the skills they need to design and build programmable robots that solve complex, real-world problems. For teachers, we also provide a full range of STEM and programming teaching materials and online lesson plans.

KEY LEARNING VALUES

Design and build programmable robots to solve problems within a STEM context
Understand and use input and output devices

Gain first-hand experience with forming and testing hypotheses



Product packaging may vary. Product remains the same.

UNIT PLAN

EV3 Computer-Integrated Manufacturing

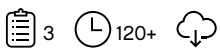
How can industrial robots control production processes? What programming algorithms are needed to make these robots efficient and safe? Using real-life manufacturing examples, students get to design, build and program different industrial robots to perform specific tasks.



UNIT PLAN

EV3 Real-World Vehicles

What does it take to create self-driving cars? What are the different ways used to sense its surrounding and what techniques are used to avoid obstacles? Using real-life examples, students get to design, build and program different vehicles with autonomous behavior to perform specific tasks.



UNIT PLAN WITH ADDITIONAL PARTS REQUIRED

EV3 Space Challenge Set

45570

Take STEM learning into the stratosphere with this expansion set co-developed with leading space experts. This set conforms to national standards and puts students to work on three space-themed research projects. The EV3 Space Challenge Set includes three learning mats, a challenge mat, dual lock tape, and all the LEGO® elements required to build the challenge models. The accompanying digital content helps teachers and students blast off to hands-on learning.

REQUIRES ADDITIONAL PRODUCTS

LEGO® MINDSTORMS® Education EV3 Core Set (45544), see page 47

KEY LEARNING VALUES

Get started with STEM and robotics
 Discover real-world applications using problem-solving skills
 Develop solutions through teamwork skills
 Learn to build, test, and evaluate robots
 Gain hands-on experience with programming, sensors, motors, and intelligent units

**EXPANSION SET**

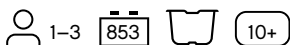
EV3 Expansion Set

45560

This set contains a wide range of supplementary elements like fun advanced building activities and additional mechanical elements to help students deepen their robotics experience and engage their creative instincts.

REQUIRES ADDITIONAL PRODUCTS

LEGO® MINDSTORMS® Education EV3 Core Set (45544), see page 47



EV3 Main Components

10+ Unless noted

EV3 Intelligent Brick

45500

EV3 Rechargeable DC Battery

45501

EV3 Large Servo Motor

45502

EV3 Medium Servo Motor

45503

EV3 Cable Pack

45514

Transformer 10V DC

8+

45517



EV3 Sensor Elements

10+ Unless noted

EV3 Ultrasonic Sensor

45504

EV3 Gyro Sensor

45505

EV3 Color Sensor

45506

EV3 Touch Sensor

45507H



Please contact your local distributor
for information on classroom bundles.

LEGO® Education SPIKE™ Prime Elements

6+ Unless noted

LEGO® Technic™ Large Hub

45601

This advanced yet simple-to-use brick-shaped device features 6 input/output ports for connecting a variety of sensors and motors, a customizable 5x5 light matrix, Bluetooth connectivity, speaker, 6-axis gyro, rechargeable lithium-ion battery and a micro USB port for connectivity with compatible computers and tablets.



LEGO® Technic™ Large Angular Motor

45602

The ideal solution for high-power, high-torque applications, featuring an integrated rotation sensor and absolute positioning for true straight-line control.



LEGO® Technic™ Medium Angular Motor

45603

Build high-response robots. Low-profile design, integrated rotation sensor with absolute positioning and 1-degree accuracy.



LEGO® Technic™ Distance Sensor

45604

Deliver high-accuracy results. 1-200cm range, +/- 1cm accuracy, programmable LED 'eyes' and an integrated 6-pin adaptor for third-party sensors, boards and DIY hardware.



LEGO® Technic™ Color Sensor

45605

Distinguishes between 8 colors and measures reflected and ambient light from darkness to bright sunlight.



LEGO® Technic™ Force Sensor

45606

Measure pressures of up to 10 Newtons (~1kg) for accurate, repeatable results. Can also be used as a touch sensor when the front button is pressed, released or bumped.



LEGO® Technic™ Large Hub Battery

45610

Rechargeable lithium-ion battery for use with the 45601 LEGO® Technic™ Large Hub (sold separately). This high-capacity, 2,000 mAh battery can be charged while fitted to the Hub using a micro USB cable and can also be removed quickly and conveniently without the need for tools. This battery is included with the 45601 Technic Large Hub and LEGO Education 45678 SPIKE™ Prime Set.



LEGO® Technic™ Micro USB Connector Cable

45611

Connects compatible computers and tablets with the 45601 Large Hub for tasks such as transferring data, performing firmware updates and charging the Large Hub.



Replacement Packs

8+ Unless noted

LME 1

70

2000700

For LME EV3 Core (45544), Expansion (45560), Base (9797) or Resource Set (9695).

LME 2

32

2000701

For LME EV3 Expansion (45560), Base (9797) or Resource Set (9695).

LME 3

4

2000702

Ball and ball joint for LME EV3 Core Set (45544).

LME 5

24

2000704

EV3 Space Challenge Set (45570) elements.

LME 6

30

2000705

For LME Base (9797), Resource (9695), Expansion (45560) or Core Set (45544).

LME 7

8

2000706

For LME Base (9797), Resource (9695), Expansion (45560) or Core Set (45544).

LE Replacement

Pack Rubber Bands

8 7+

2000707

Eight each: red, white, blue, yellow.

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