



education™

LEGO® Education 2020 Solution Guide





Celebrating 40 Years of Hands-On Learning

There are special moments in the classroom every teacher knows. When everything comes together. When every student is minds-on, engaged. When discovery is in the air.

For the last 40 years, LEGO® Education has been striving to bring those moments to every classroom—so every student can experience the power and wonder of learning through play.

We've developed an intelligent, creative product continuum to help teachers engage all students K–12 and naturally embed STEAM thinking in the classroom. With our carefully designed system of bricks and our robust hardware and software platform, teachers can activate students' curiosity, inspire their creativity and develop their critical thinking. And with lesson plans, expansion packs and complementary afterschool opportunities, the possibilities are as limitless as your students' imaginations.

In an exciting and ever-changing world, students need to develop the skills and courage to innovate. Let's empower every student to turn their natural curiosity into creative exploration, so they can take on the future as it changes around them.

At LEGO Education, we're committed to giving you the tools you need to build your students' confidence in learning and to nurture the minds of tomorrow. Let's engage students at every level and bring doing, making and creating back into the classroom.

Happy building,



Esben Stærk
President of LEGO Education



What is LEGO® Education?

LEGO® Education is dedicated to inspiring the students of today to be the smart, creative, and STEAM-minded leaders of tomorrow. We believe that building skills through hands-on learning is essential to building bright futures. We're committed to fully engaged, imaginative learning.

Hands-On LEGO® Learning

Studies have shown that being physically engaged before, during, or after learning something helps your brain retain that information. Each hands-on solution incorporates the five characteristics of playful learning experiences as identified by the LEGO Foundation: joyful, actively engaging, socially interactive, iterative, and meaningful.

Three Levels of Learning

The products in this catalog are organized into three developmental levels: early, primary, and secondary learning. Look for the tabs throughout the catalog to help you find the best solution for your students.

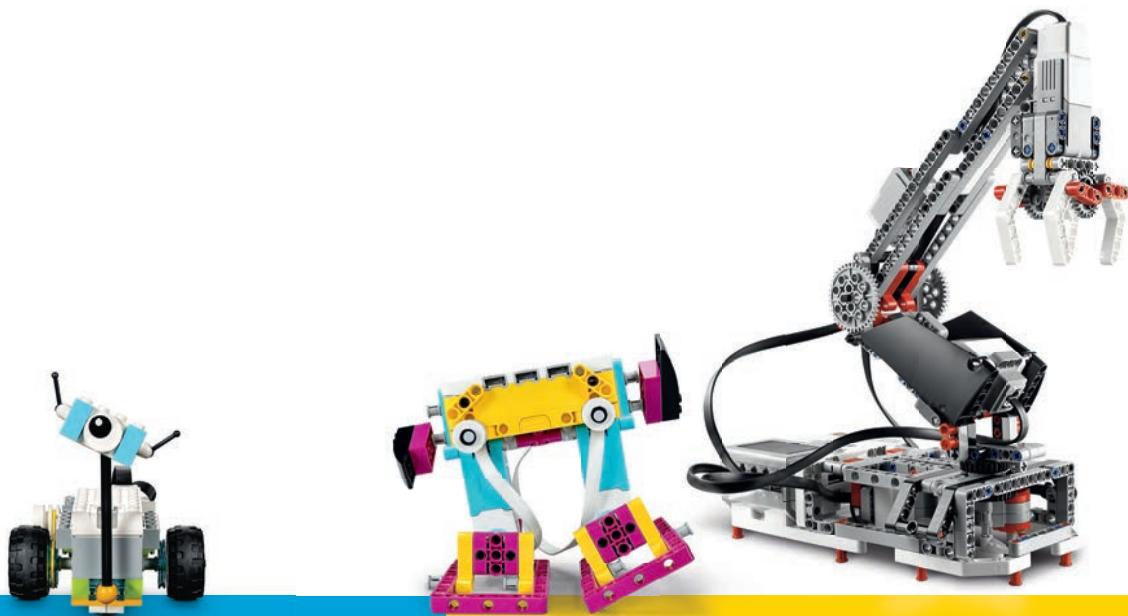


EARLY LEARNING

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.

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.

PRIMARY LEARNING

P

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	LEGO® EDUCATION SPIKE™ PRIME	LEGO® MINDSTORMS® EDUCATION EV3
WeDo 2.0 Core Set	LEGO® Education SPIKE™ Prime Set LEGO Education SPIKE Prime Expansion Set	LEGO® MINDSTORMS® Education EV3 Core Set EV3 Space Challenge Set EV3 Expansion Set
 		
EARLY SIMPLE MACHINES SIMPLE MACHINES		SIMPLE & POWERED MACHINES
Early Simple Machines Core Set Simple Machines Core Set		Simple & Powered Machines Core Set
 		



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

Face-to-face training is available.

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.

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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® MINDSTORMS® Education EV3 and LEGO Education WeDo 2.0 technology.

Get involved at: www.WRO-association.org

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World Robot Olympiad™ and the WRO® logo are trademarks of World Robot Olympiad Association Ltd. ©2019 World Robot Olympiad Association Ltd.

A New Addition to Competitions

For robotics competitions such as *FIRST*® LEGO® League and WRO, the LEGO Education SPIKE™ Prime Expansion Set and Competition Ready unit help empower students and teachers who are new to robotics and in need of more formalized training. The final lesson of the unit has direct ties to the annual *FIRST* LEGO League Robot Game, making this the ideal start of the exciting Competitions journey in or out of the classroom.



FIRST® LEGO® League Jr. Discovery Edition is a playful introductory STEM program for teams of children ages 4-6, that ignites their natural curiosity and builds their habits of learning. By the end of the program, children emerge more confident, better equipped to face future challenges, and discover the joy of learning. Children use STEAM Park and a specially designed LEGO DUPLO® Discovery Set to solve real-world problems.

Get involved at www.FIRSTLEGOLeaguejr.org/discovery.



The focus of FIRST LEGO League Jr. is to encourage the spirit of discovery in young children. This program ignites their natural curiosity by introducing them to real-life science concepts, inspiring their sense of wonder via collaboration, research, and building. With the help of adult coaches, students use LEGO Education WeDo 2.0 technology to build and program a moving model based on an exclusive FIRST LEGO League Jr. Inspire Set.

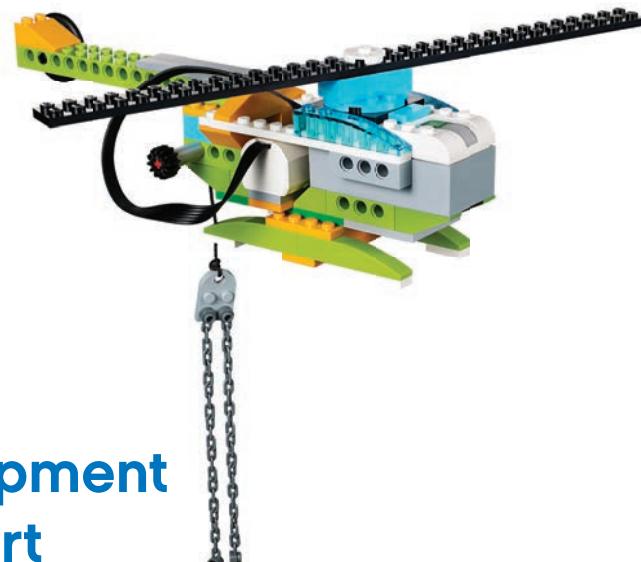
Get involved at www.FIRSTLEGOLeaguejr.org.



Since today's students are the leaders of tomorrow, this competition puts them to work solving real-world science and technology challenges. Teams design their own solutions to a current scientific problem, building and coding autonomous LEGO MINDSTORMS robots to perform a series of missions based on an annual theme. This helps students develop their creativity and problem-solving skills, gain confidence in their ability to overcome obstacles, and open their eyes to the wide world of career options in STEAM.

Get involved at www.FIRSTLEGOLeague.org.





Professional Development and Ongoing Support

At LEGO® Education, we understand that you go out of your way to support your students. This is why we strive to go the extra mile to help you feel confident with our solutions. Here are three tangible ways we support teachers on their LEGO Education journey.

Professional Development

Our hands-on Professional Development programs support educators in acquiring relevant competencies to foster student success and engagement. Collaborative, interactive, and fun professional learning offers educators opportunities to learn, practice, and master new skills to facilitate effective STEAM experiences with LEGO Education solutions. Participants learn how to implement the solutions in their classrooms to unleash the potential for students to achieve deeper STEAM learning.

Global Consumer Service Team

This team is available by phone or email to answer all your questions. Think of it like tech support for your classroom.

Online Resources

Each LEGO Education solution gets you access to free online support in the form of FAQs. Some solutions even include video tutorials and more! You can also use this training to fuel professional development.



EARLY LEARNING

LEGO education™



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

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

Learning solutions

Start the STEAM learning and develop social skills

STEAM & Social development



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

Add fun with booster sets

Booster Sets



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



E EARLY LEARNING

LEARNING SOLUTION - FOCUS ON STEAM SKILLS

STEAM Park

45024

STEAM Park builds on every child's natural curiosity and desire to explore, and investigate the world of early science, technology, engineering, art, and math (STEAM) through creative play. The possibilities are endless, as you work with them to construct a STEAM Park full of dynamic moving rides, fun games, and scenes using the special selection of LEGO® DUPLO® bricks. With every trip to the STEAM Park, children grow their understanding of gears, motion, measurement, and solving problems together in a fun and engaging way.

- Online unit plan with eight lessons
- Full-day professional development course as add-on
- Inbox material:
 - 295 DUPLO bricks, including gears, tracks, pulleys, boats, and figures
 - Getting Started activity card
 - 8 double-sided inspiration cards

KEY LEARNING VALUES

Cause and effect
Spatial awareness
Observing and describing
Problem solving
Role play and collaboration

1-8 [295] 3-5



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E EARLY LEARNING

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

 1–6  188  3–5

LEARNING SOLUTION - FOCUS ON EARLY LITERACY SKILLS

Story Tales

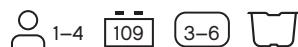
45005

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

ACTION BRICKS

Action bricks make the train come alive

**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



95

3-6



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  150  3–6**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  130  3–6

**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	1-6	160	3-5
45019			
Creative LEGO® Brick Set	8+	1000	4+
45020			
Community Starter Set	10+	1907	4+
9389			
Sceneries Set	8+	1207	4+
9385			
Community Minifigure Set	1-6	256	4+
45022			
Fantasy Minifigure Set	1-6	213	4+
45023			
Space & Airport Set	1-6	1176	4+
9335			
Vehicles Set	1-6	934	4+
9333			

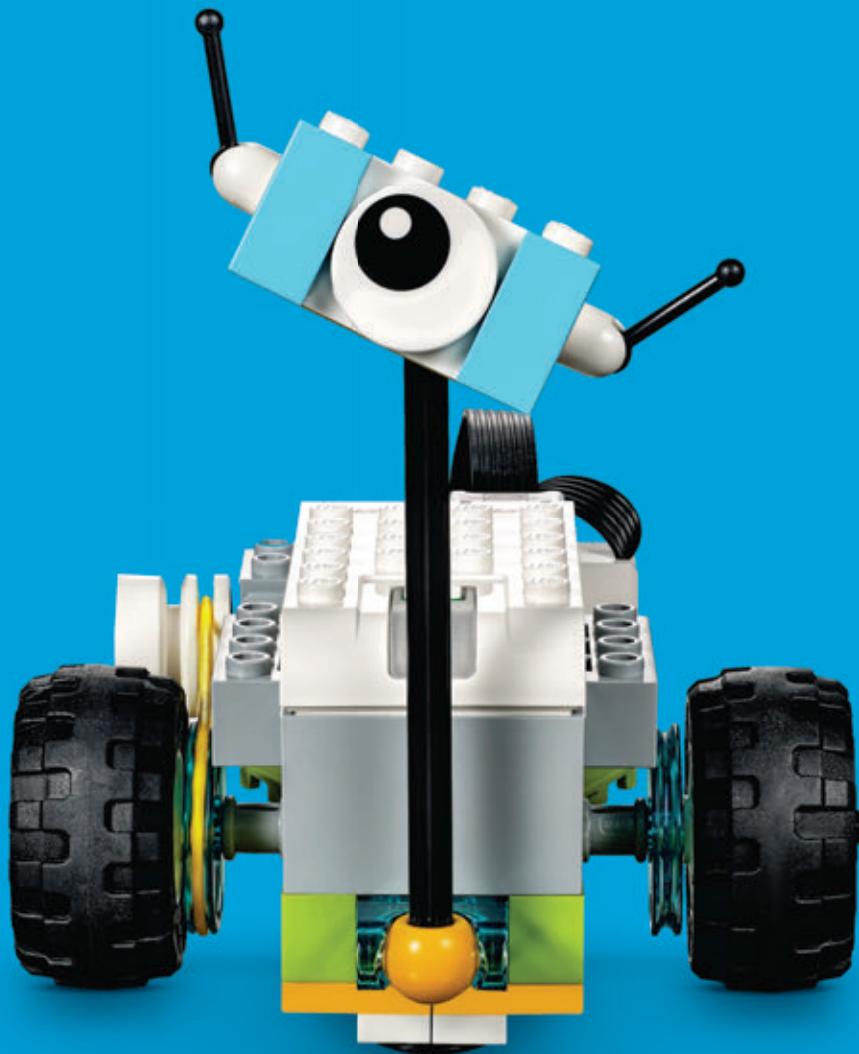
Accessories

4+ Unless noted	
Large LEGO® Building Plates	4
9286	
Includes one gray 38 x 38 cm, two green 25 x 25 cm, and one blue 25 x 25 cm building plates.	
Small LEGO® Building Plates	22
9388	
Three different sizes in a variety of colors.	
Large LEGO® DUPLO® Building Plates	2
9071	1.5+
38 x 38 cm. One red, one green. LEGO® DUPLO®.	
Doors, Windows & Roof Tiles	278
9386	
Windows with shutters, doors, and roof tiles. LEGO bricks.	
Wheels Set	286
9387	
Four sizes of tires along with plates, axles, and wheel hubs, for building up to 12 different vehicles at the same time.	

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.

24 30–120

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.

8 90–120

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.

4 45–90

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.



SUCCESS STORY

Inspiring Students to Reach for the Stars

In April of 1993, Ellen Ochoa became the first Latina astronaut to ever go to space. Today, FIRST® LEGO® League Jr. is helping the students at her namesake elementary school learn to shoot for the stars. Elementary school students from Ellen Ochoa STEM Academy in Grand Prairie, Texas participated in the CREATURE CRAZETM Challenge and learned a lot about the important role of bees in human existence. Using WeDo 2.0 and the annual Inspire Set, the intrepid STEMVentors (a team name the students chose together) set to work making a moving model to show how astronauts could potentially harness bee power to make life on Mars a reality.

During the competition, the students also got a chance to visit NASA headquarters and talk about their research. “The experience was life-changing for many of our students and their families who had never been outside our community,” says technology teacher Carmela Brown, adding that her students were excited to see what opportunities lay ahead of them in the STEAM fields. Thanks to their time in FIRST LEGO League Jr., the students’ interest in robotics and other STEAM topics was launched into the stratosphere.

FIRST LEGO LEAGUE JR.

Ages 6-10 (Grades K-4)

PROVEN, VERIFIABLE IMPACT
FOR PARTICIPANTS IN
FIRST® LEGO® LEAGUE JR.**

98% SHOWED GREATER AWARENESS OF STEM

85% WERE BETTER ABLE TO EXPLAIN IDEAS

71% COULD PROBLEM-SOLVE

88% SHOWED TEAMWORK SKILLS

**FIRST® LEGO® League Jr. Evaluation Study (2014), The Research Group, Lawrence Hall of Science, University of California, Berkeley and Brandeis University, 2013 FIRST LEGO League Evaluation

EARLY SIMPLE MACHINES & SIMPLE MACHINES

Powering Exploration and Investigation

Get students' creative wheels turning with two engaging solutions. These two solutions teach the basic mechanical principles behind gears, pulleys, levers, axles, and more. Digital tools and unit plans help launch students' engagement to the next level.

SOLUTIONS INCLUDE

CORE

EARLY SIMPLE MACHINES CORE SET

SIMPLE MACHINES CORE SET

UNIT PLANS

EARLY SIMPLE MACHINES

SIMPLE MACHINES

SIMPLE MACHINES MAKER

SUPPORT

QUICK-START GUIDES

PLUS: ASSESSMENT TOOLS & TECHNICAL SUPPORT

ADDITIONS

ACCESSORIES & REPLACEMENT PACKS

TRAINING & PROFESSIONAL DEVELOPMENT



STEAM

"Because my students are so young, nothing stands in their way when it comes to solving problems together. They are very quick to learn that just because I am the 'teacher,' I do not have all the answers, and soon become confident with their own discoveries."

MARY MEADOWS

HEAD OF SCHOOL AT ANDREWS

ACADEMY-CREVE COEUR,

CREVE COEUR, MISSOURI



STEAM

UNIT PLAN

Early Simple Machines

This unit plan contains 12 lessons: six beginner lessons, four intermediate lessons, and two advanced lessons. This unit plan is designed to help kindergarteners through second graders discover how gears, axles, pulleys, and more work by building them using LEGO® DUPLO® bricks.

12 30–45

CORE

Early Simple Machines Core Set

9656

This set has all the gears, levers, pulleys, wheels, wings, and more that students need to explore real-world science concepts. With building instructions, student worksheets, and teacher guides, this set sparks engaged learning, problem-solving skills, creativity, and critical thinking.

KEY LEARNING VALUES

Basic mechanical principles, such as gears, levers, pulleys, wheels, and axles

Investigating force, buoyancy, and balance

Problem-solving through design

Collaboration and data sharing

1-3 102 5+



CORE

Simple Machines Core Set

9689

Use this set to help students investigate and understand the operation of simple and compound machines. This set features an assortment of bricks, gears, wheels, pulleys, and levers to inspire students to explore science and engineering.

KEY LEARNING VALUES

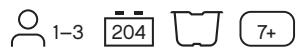
Observe and investigate

Develop scientific inquiry skills

Follow a design brief as part of the engineering design process

Learn to apply relevant vocabulary for simple machines

Test, predict, and measure; collect data and describe outcomes

**UNIT PLAN**

Simple Machines

Ignite students' curiosity about science and engineering with this unit plan. The Simple Machines unit plan includes 20 lessons with instructions for a variety of models and problem-solving activities. As they work through them, students will develop critical-thinking skills while investigating simple and compound machines.

**UNIT PLAN**

Simple Machines Maker

Introduce elementary school students to the hands-on creative freedom of Maker. Using open-ended questions and real-life scenarios, students can think up ideas, tinker with prototypes, and build and develop solutions using the LEGO® Education Simple Machines Core Set and other materials from around the classroom. Through worksheets and assessments, students can feel supported and inspired, and teachers can have the creative confidence to help students think up new ideas.



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

8+

Replacement Pack WeDo 2.0

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 M&M 2

2000709

LEGO® Education Replacement Packs are the ideal way to replace missing elements of your LEGO Education sets. This pack includes 42 elements for the Simple Machines Core Set (9689).



LE Replacement Pack Rubber Bands

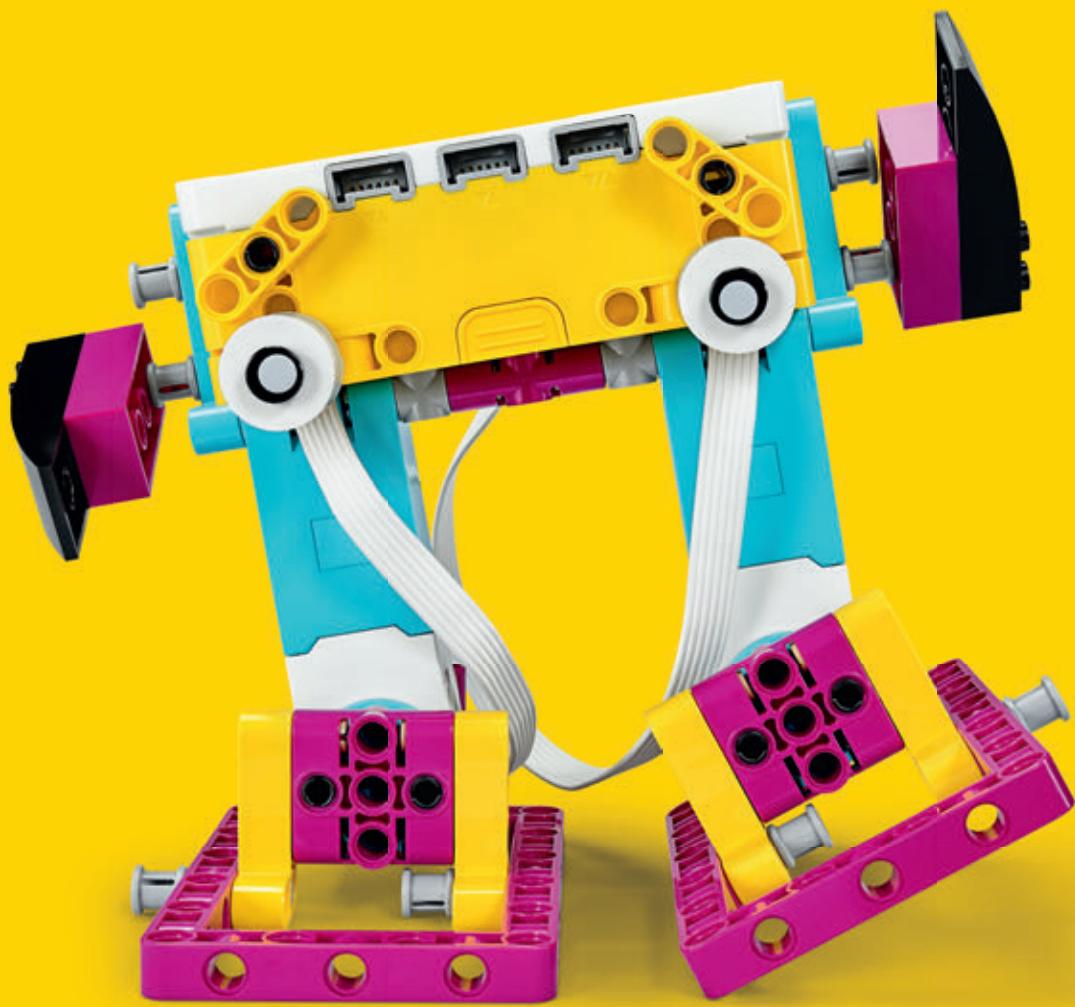
2000707

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) and Simple & Powered Machines Core Set (9686).



Please contact your local distributor for information on classroom bundles.

S



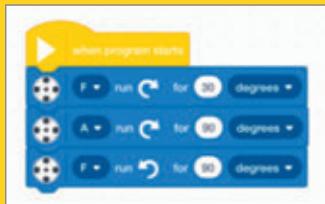
SECONDARY

LEGO education™



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

LEGOeducation.com

LEGO® EDUCATION SPIKE™ PRIME Building STEAM Skills and Confidence in Middle School

LEGO® Education SPIKE™ Prime helps spark STEAM curiosity and confidence in middle school students. This concept brings together colorful LEGO building elements, easy-to-use hardware, intuitive coding language based on Scratch and student-ready units to continuously engage your class regardless of their learning level. The endless creative design possibilities and easy-entry lessons of SPIKE Prime help students explore through playful learning and build the STEAM skills they need to become the innovative minds of tomorrow.

SOLUTION INCLUDES

SET & APP

LEGO® EDUCATION SPIKE™ PRIME SET

LEGO® EDUCATION SPIKE™ APP

UNIT PLANS

INVENTION SQUAD

KICKSTART A BUSINESS

LIFE HACKS

SUPPORT

GETTING STARTED MATERIAL

LESSON PLANS

PLUS: ASSESSMENT TOOLS & TECHNICAL SUPPORT

ADDITIONS

EXPANSION SET

LEGO® EDUCATION SPIKE™ PRIME EXPANSION SET

UNIT PLANS

COMPETITION READY

ACCESSORIES & REPLACEMENT PACKS

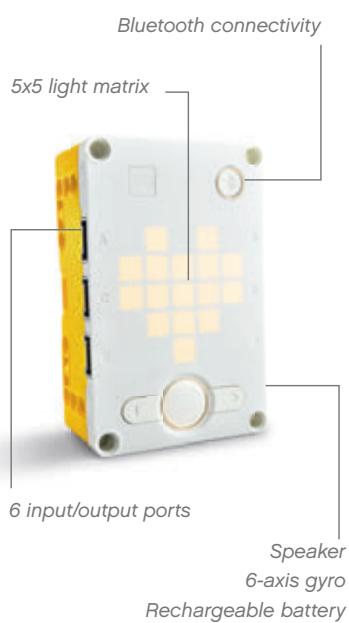
TRAINING & PROFESSIONAL DEVELOPMENT



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, 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.

1-2 523 10+

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 teamwork 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**

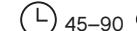
Connect the Hub and create a LEGO emoji.

MOTORS AND SENSORS

Explore action-reaction.

MAKE IT MOVE

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.

SPIKE PRIME EXPANSION SET**COMPETITION READY**

8

Use curiosity and teamwork.



"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

LEGOeducation.com

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 CLASROOM

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

1-3 541 10+



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.

4 120+

**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.

3 120+



SUCCESS STORY

More Engaged Students One Robot at a Time

A wise woman once said, "Even failure with robots can be engaging." That woman is Caroline Hanson, the Ascent Enrichment and Robotics teacher at Aspen Middle School who uses LEGO® Education tools to inspire her students every day. Her 6th–8th grade students work on projects inspired by real-world science, engineering, and space challenges.

With LEGO Education, Hanson's students "get to see the concepts outside of controlled experiments and pieces of paper." Sometimes they're so engrossed that they come in after school—like the student who spent days designing and building a robotic chairlift. There's something in LEGO Education for every student, according to Hanson, who says she loves how each project also hones skills like problem-solving and critical thinking. "Different strengths emerge in robotics," Hanson says, "and students have a chance to shine apart from their academic work."

FIRST® LEGO® LEAGUE

Ages 9-14 (Grades 4-8)

PROVEN, VERIFIABLE IMPACT
FOR PARTICIPANTS IN
FIRST® LEGO® LEAGUE™

 **98%**
IMPROVED PROBLEM-SOLVING SKILLS

 **95%**
INCREASED TIME MANAGEMENT SKILLS

 **93%**
INCREASED CONFLICT RESOLUTION SKILLS

 **OVER 76%**
STRENGTHENED COMMUNICATION SKILLS

**FIRST® LEGO® League Jr. Evaluation Study (2014), The Research Group, Lawrence Hall of Science, University of California, Berkeley and Brandeis University, 2013 FIRST LEGO League Evaluation

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 44

**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 44





STEAM

"They're focused.
They're asking questions.
They're going beyond what
they're required to do."

LAURA KNAPP
K-5 TECHNOLOGY TEACHER,
GATEWAY SCIENCE ACADEMY
SOUTH, ST. LOUIS, MISSOURI

SIMPLE & POWERED MACHINES

Powering “Aha!” Moments

This solution helps students in grades 6–8 learn about a broad range of concepts, such as force, motion, and energy. Using 396 LEGO® Technic™ bricks and a motor to model physicality, students can get hands-on experience with problem-solving, collaboration, and other 21st-century skills. Watch as these bricks and unit plans spark creativity, ignite career opportunities, and develop critical-thinking and observation skills.

SOLUTIONS INCLUDE

CORE

SIMPLE & POWERED MACHINES

UNIT PLANS

INTRODUCING SIMPLE & POWERED MACHINES

ADVANCING WITH SIMPLE & POWERED MACHINES

SIMPLE & POWERED MACHINES MAKER

SUPPORT

QUICK-START GUIDES

PLUS: ASSESSMENT TOOLS & TECHNICAL SUPPORT

ADDITIONS

ACCESSORIES & REPLACEMENT PACKS

TRAINING & PROFESSIONAL DEVELOPMENT

CORE

Simple & Powered Machines Core Set

9686

This is the STEAM tool that helps students investigate everything from basic mechanical principles to advanced motor-powered machines. Let STEAM curiosity rev up with full lessons, extension activities, and problem-solving tasks that help students explore design engineering with more advanced mechanisms, structures, and forces.

KEY LEARNING VALUES

Investigate the principles of simple machines, mechanisms, and structures
 Experiment with balanced and unbalanced forces
 Experiment with friction
 Transformation of energy
 Measure distance, time, speed, and weight
 Calibrate scales
 Investigate powered forces, motion, speed, and pulling power

**UNIT PLANS**

Introducing Simple & Powered Machines

Using model activities and problem-solving tasks, students get a fundamental understanding of simple machines, structures, and mechanisms.

Advancing with Simple & Powered Machines

Use our unit plan to actively engage students in inquiry, reasoning, and critical thinking. This unit plan is designed to apply students' prior learning in science, technology, and mathematics together with their engineering skills, creativity, and intuition.

Simple & Powered Machines Maker

Using open-ended problem-based design challenges, teachers can encourage their students to really explore the world of machines and mechanisms.

Power Functions

7+

Power Functions**Extension Wire 20"**

8871

**Power Functions****Extension Wire 8"**

8886

**Power Functions M-Motor**

8883

**Power Functions Light**

8870

**Power Functions Battery Box**

8881



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**

45507

**EV3 Infrared Beacon**

45508

**EV3 Infrared Sensor**

45509



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.



Please contact your local distributor for information on classroom bundles.

Replacement Packs

8+ Unless noted

LME 1

70

2000700

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

70



LME 2

32

2000701

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

32



LME 3

4

2000702

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

4



LME 5

24

2000704

EV3 Space Challenge Set (45570) elements.

24



LME 6

30

2000705

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

30



LME 7

8

2000706

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

8



LE Replacement Pack Rubber Bands

8 **7+**

2000707

Eight each: red, white, blue, yellow. For LME EV3 Expansion (45560), Base (9797) or Resource Set (9695) and Simple & Powered Machines Set (9686).

M&M Replacement Pack 1

60

2000708

LEGO® Education Replacement Packs are the ideal way to replace key elements for your LEGO Education products. This pack includes 60 elements for Simple & Powered Machines Set (9686).

LE Replacement Pack Prime

108 **10+**

2000719

Keep your LEGO® Education SPIKE™ Prime Set (45678) in perfect working order with the LE Replacement Pack Prime. With over 100 LEGO Technic™ and System elements, this replacement pack means you won't waste precious classroom time searching for missing pieces.



For easy access to your full suite of LEGO® Education resources, visit LEGOeducation.com/start

LEGOeducation.com

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Colors of and decorative designs on elements may vary. 6322788

