



# LEGO® Education 2024 Solution Guide



education™



# A note from Victor Saeijs, President of LEGO® Education

It is a privilege to present the newest edition of the LEGO® Education Solution Guide. I feel humbled and honored every day to be part of a company whose mission is to improve the lives of students all over the world, preparing them to thrive in an unknown future. The reality is that workplaces and the world itself will look vastly different by the time today's students graduate. Global challenges are impacting the way we live and thrive, technology advancements are transforming the world as we know it, and new jobs are demanding different skills.

However, the future is not bleak – in fact – it's anything but. Today's students are capable of anything, and they show us that in and outside of the classroom. Today's students are our future leaders and changemakers – the ones reimagining a better world. And I have no doubt that they will succeed. But it's imperative that we do our part by teaching students to think critically and boldly, problem-solve, and practice resilience so they can confidently navigate this ever-changing world.

In 2024, we will continue doing our part – relentlessly championing all students. We are committed to the mission of delivering joyful learning experiences to students and educators all over the world. Because we know that when learning is joyful, it is meaningful, motivating, and engaging.

We are dedicated to our learning through play methodology. It's not only a powerful catalyst for joyful and meaningful learning, but it's also proven to increase student engagement and outcomes, facilitate holistic skill-development, and foster a lifelong love of learning. We are excited to continue this journey alongside all of you as we collectively empower students and help them gain the knowledge and skills needed to rebuild a better world for all of us.

Happy Learning,



Victor Saeijs  
President of LEGO Education



# 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.








## SOLUTIONS INCLUDE

<b>CORE</b> A tailored brick set for building engaging, meaningful, hands-on learning experiences.	<b>SOFTWARE</b> Easy-to-use software and apps for a range of devices.	<b>UNIT PLANS</b> Subject-specific lessons and activities aligned to national standards.	<b>TEACHER SUPPORT</b> Tools, rubrics, and teacher guides.	<b>TECHNICAL SUPPORT</b> Online and phone support to address your inquiries or questions.
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## ADDITIONS

<b>EXPANSION SETS &amp; UNIT PLANS</b> Additional unit plans and brick expansion sets to help take the LEGO® Education experience to the next level.	<b>PROFESSIONAL DEVELOPMENT</b> Facilitated product training with a LEGO® Education certified trainer	<b>ACCESSORIES</b> Additional accessories are available to build on core and expansion sets.	<b>REPLACEMENT PACKS</b> 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



# LEGO® Education inspires learning you can build on

The belief that learning should be joyful for both students and teachers has driven LEGO® Education to lead the way in innovative, hands-on learning for more than 40 years. Our range of solutions are designed not only to meet academic standards, but also inspire all students to see themselves as the change makers of tomorrow.



# The LEGO<sup>®</sup> Learning System

A system of integrated and scalable components



# Interconnected Solutions That Work Seamlessly Together

The easy-to-adopt LEGO® Learning System offers solutions that work with or without technology. Implement the full system at once or introduce individual solutions over time. Built-in scaffolding makes it easy for students and teachers to get started and move seamlessly through the learning experiences, driving familiarity over time to unlock deeper learning across grade levels.

## Early Learning



### The LEGO® Education Early Learning Portfolio

**A strong foundation for moving into the LEGO Learning System.**

All of our early learning solutions build on the same learning through-play principles to stimulate children's curiosity and desire to explore together-preparing them for school and life.



# Primary

## LEGO® Education SPIKE™ Portfolio

Premium, technology-enhanced STEAM solutions.

The LEGO® Education SPIKE™ portfolio encourages broad STEAM learning and the application of computational thinking with a focus on coding, technology, and digital integration.



## LEGO® Education BricQ Motion

Non-tech solutions with a focus on physical science.

LEGO® Education BricQ Motion provides a foundational understanding of physical science concepts and an analog introduction to computational thinking.

# Secondary



LEGO Education SPIKE - L1

This is uphill

Variables

Make a variable

Make a List

Line Graph

More Motors

Lesson

04/06

007/0:14

Let's go uphill!

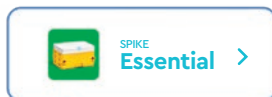
I can see my new graph.

I can answer these questions:

How can you describe what's happening to the motor's power as the bike goes uphill?

Looking at the graph, where can you see that your bike is gaining potential energy?

# One App Unlimited Possibilities



Engage every student in playful STEAM learning with the LEGO® Education SPIKE™ App. Designed for use with the LEGO® Education SPIKE™ Portfolio, the SPIKE App is a powerful tool that helps teachers facilitate engaging, hands-on STEAM learning. Students progress from simple icon-blocks to word-block coding based on Scratch and finally Python to code their creations and bring STEAM learning to life.

The SPIKE App offers exciting and playful learning experiences with enhanced programming possibilities, where students can build, tinker and experiment- progressing from simple builds to complex creations.

Learn more at  
[LEGOeducation.com/downloads](https://LEGOeducation.com/downloads)



# Confident Teachers Develop Confident Students

LEGO® Education Professional Development Program builds teachers' confidence in delivering effective playful, hands-on STEAM learning at every level. This experiential learning program is designed to actively engage teachers and produce a strong set of transferrable instructional skills and strategies.

## Professional Development

Equip teachers with an array of integrated skills that emphasize students agency, such as an experiential learning, project-based learning, and active learning. Inspire teachers to learn from others, to reflect, and to apply new methods in teaching.

## LEGO® Education Facilitated Learning

Full-day product training courses are facilitated by a certified LEGO® Education trainer. Held virtually or on-site, these courses provide engaging learning experiences that build teachers' confidence in facilitating playful, hands on STEAM learning using LEGO Education products.

Start your learning journey now  
[LEGOeducation.com/Distributor](https://LEGOeducation.com/Distributor)



# Bringing *FIRST*<sup>®</sup> LEGO<sup>®</sup> League into the Classroom



*FIRST*<sup>®</sup> LEGO<sup>®</sup> League introduces science, technology, engineering, math and art (STEAM) to children ages 4-16\* through fun, exciting hands-on learning. *FIRST* LEGO League's three divisions inspire children to experiment and grow their critical thinking, coding, and design skills through hands-on STEM learning. Throughout the strategic partnership with *FIRST*<sup>®</sup>, LEGO<sup>®</sup> Education proudly develops and supports programs and events that bring these learning opportunities to students all over the world.

## ***FIRST*<sup>®</sup> LEGO<sup>®</sup> League Class Packs & Lessons**

Over the past three years, nearly 30.000 students in the German region of Hessen, have participated in *FIRST*<sup>®</sup> LEGO<sup>®</sup> League in their classroom, as part of the statewide 'Löwenstart – der BildungskICK' initiative to enhance digital skills, implemented by the Hessian Ministry of Culture. Implementing *FIRST* LEGO League Class Packs inside the classroom, has led to a boost in STEM competencies, curiosity, and teamwork skills among students, and fostered a sense of achievement. The schools that participate in this project organize culminating events where all teams compete with their LEGO<sup>®</sup> Education SPIKE™ Prime robots and get to present their Innovation Projects.

*FIRST*<sup>®</sup> and the *FIRST*<sup>®</sup> logo are trademarks of For Inspiration and Recognition of Science and Technology (*FIRST*).  
*FIRST*<sup>®</sup> LEGO<sup>®</sup> League is a jointly held trademark of *FIRST* and the LEGO Group. ©2024 *FIRST*<sup>®</sup> and the LEGO Group. All rights reserved.

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 Benefits**

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 SPIKE™ Essential.

**Core Value**

Practice STEM concepts

**Key Benefits**

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® Education SPIKE™ Prime 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 Benefits**

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

Learn more about the Class packs  
[FIRSTinspires.org/class-pack](https://FIRSTinspires.org/class-pack)





World Robot Olympiad™ exists to ignite a passion for STEM in every child, regardless of their language, background, or opportunities.

WRO® has connected more than 650,000 children and young people worldwide, allowing them to compete as equals on an international stage.

This global robotics competition gives young thinkers a chance to compete on a global scale. Students from more than 85 countries participate in four different categories to create robots that solve specific challenges or offer a solution to thematic problems. LEGO® Education is a proud premium sponsor of WRO.

Explore the competition  
[WRO-association.org](https://wro-association.org)







SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH



EARLY CODING



SOCIAL &  
EMOTIONAL  
DEVELOPMENT



EARLY LANGUAGE  
& LITERACY

## 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.

# Kindergarten solutions

The foundation to enter the LEGO® Learning System

*Early computer science, STEAM and literacy*



**Coding Express**

- Lessons: 8
- Up to 6 children



**STEAM Park**

- Lessons: 8
- Up to 8 children



**StoryTales**

- Lessons: 8
- Up to 4 children

## Preschool solutions

Focus on individual skills

*Strengthen social skills*



**My XL World**

- Lessons: 8
- Up to 10 children

*Strengthen engineering skills*



**Tech Machines**

- Lessons: 8
- Up to 6 children



**Tubes**



**Letters**

**Animals**



**People**



**Creative  
LEGO® DUPLO®  
Brick Set**

# STEAM Park

45024    👤 1-8    📦 295    🎂 3-5



SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH

STEAM Park builds on every child's natural curiosity and desire to create, explore, and investigate the world of early science, technology, engineering, art, and maths (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 STEAM Park, children grow their understanding of gears, motion, measurement, and solving problems together in a fun and engaging way.

## KEY LEARNING VALUES

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



### 11 Lessons

Standards-aligned experiences ready for class.



### 295 Elements

Including bricks, gears, ramps & pulleys.



### Resources

Classroom activities & technical support.



### Community

Learn & share with other teachers.



### Professional Development

Teacher resources & getting started materials.





# Coding Express

45025    👤 1-6    📦 234    🕒 2-5

✓ EARLY CODING

LEGO® Education Coding Express is a creative, intuitive, and versatile solution that introduces children to early coding concepts that naturally sparks their curiosity, creativity and desire to explore and learn together as they prepare for school. LEGO Education Coding Express makes it intuitive and fun for kindergarten students to learn early coding concepts and critical 21st century skills through playful, hands-on learning with LEGO® DUPLO® bricks. Coding Express lessons are aligned to kindergarten standards for Common Core, CSTA and NGSS.

Download the LEGO Education Coding Express App for free to unlock more learning opportunities.

## KEY LEARNING VALUES

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

📖 **8 Lessons**  
Standards-aligned experiences ready for class.

🔗 **Resources**  
Classroom activities & technical support.

📦 **234 Elements**  
Including bricks, DUPLO® Connected Train Hub & tracks.

👤 **Professional Development**  
Teacher resources & getting started materials.

📱 **Coding App**  
LEGO® Education Coding Express App for students included.

🗣️ **Community**  
Learn & share with other teachers.





## 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://LEGOeducation.com/start)



# Story Tales

45005  1-4  109  3-6



**FOCUS ON EARLY LITERACY SKILLS**

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!

## KEY LEARNING VALUES

- Storytelling
- Speaking and listening
- Language and literacy



### 8 Lessons

Standards-aligned experiences ready for class.



### 109 Elements

Including bricks, characters & background cards.



### Resources

Classroom activities & technical support.



### Community

Learn & share with other teachers.



### Professional Development

Teacher resources & getting started materials.





# My XL World

45028    1-10    480    2-6

 **FOCUS ON SOCIAL SKILLS**

Working in groups of 2-10, children use the colorful collection of 480 LEGO® DUPLO® bricks, figures, wheel bases, windows, doors and a building plate to build their home, a restaurant, bus stop, hospital and a fire station. They'll also discover an airplane, car and even a submarine, and will use their imagination to build fantasy animals and make up fun stories of their own.

## KEY LEARNING VALUES

- Collaboration
- Role play
- Roles and responsibilities

### **8 Lessons**

Standards-aligned experiences ready for class.

### **480 Elements**

Including bricks, flowers, windows, doors & six DUPLO figures.

### **Resources**

Classroom activities & technical support.

### **Community**

Learn & share with other teachers.

### **Professional Development**

Teacher resources & getting started materials.



# Tech Machines

45002



1-6



95



3-6



**FOCUS ON  
ENGINEERING SKILLS**

Transform your children into expert builders! With the Tech Machines Set in your classroom, you'll help children develop their fine motor and problem-solving skills while simultaneously unleashing their creativity as they construct classic machines.

## KEY LEARNING VALUES

- Fine-motor skills
- Problem-solving
- Engineering



### 8 Lessons

Standards-aligned experiences ready for class.



### 95 Elements

Including 4 screwdrivers and many unique elements.



### Resources

Classroom activities & technical support.



### Community

Learn & share with other teachers.




### Professional Development

Teacher resources & getting started materials.



# Tubes

45026  1-6  150  3-6




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



# Letters

45027  1-4  130  3-6

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



# Animals

45029    👤 1-4    📦 91    🎂 2-6

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



# People

45030    👤 1-4    📦 44    🎂 2-6

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



# Additional Products

## Creative LEGO® DUPLO® Brick Set

45019

1-6 160 3-5



## Creative LEGO® Brick Set

45020

8+ 1000 4+



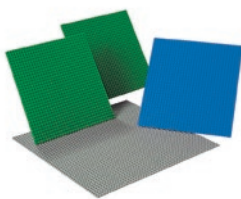
# Accessories

## Large LEGO® Building Plates

9286

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

4 4+

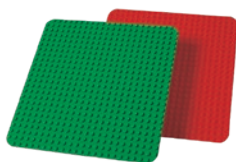


## Large LEGO® DUPLO® Building Plates

9071

Two large building plates – one red, one green – provide the perfect foundation for learning through play. Size 38 × 38 cm.

2 1,5+



# Storage

## Large Storage Solution

9840

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

1,5+



## Medium Storage

45496

This storage box comes in packs of 8 and is available in yellow. Each box has a white lid and is stackable both with and without the lid. The box is similar in size to the storage boxes for LEGO® Education SPIKE™ Essential and LEGO® Education SPIKE™ Prime.

5+



## Small Storage

45497

Comes in packs of seven with transparent lids. Stack easily.

5+



## Sorting Top Tray

45499

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

5+



Please contact your local distributor for information on classroom bundles  
[LEGOeducation.com](http://LEGOeducation.com)







SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH



CODING

**CODE CONFIDENTLY**  
Develop students' coding capabilities by progressing from icon blocks to word blocks based on Scratch.



## SYSTEM REQUIREMENTS

LEGO® Education SPIKE™ Essential utilizes a coding language based in 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](https://LEGOeducation.com/start)

LEGO® Education SPIKE™ Essential

# Ignite Primary School Student's Passion for STEAM Learning

Engage students in hands-on investigation of STEAM concepts while contributing to literacy, math, and social-emotional development. LEGO® Education SPIKE™ Essential excites students and delivers strong STEAM learning outcomes, developing their STEAM knowledge and practices—and 21st century skills.

## THIS SOLUTION INCLUDES



### 100+ Hours of Learning

Standards-aligned experiences ready for class.



### Resources

Classroom activities & technical support.



### 449 Elements

Including bricks, motors, sensors & hub.



### Professional Development

Teacher resources & getting started materials.



### Coding App

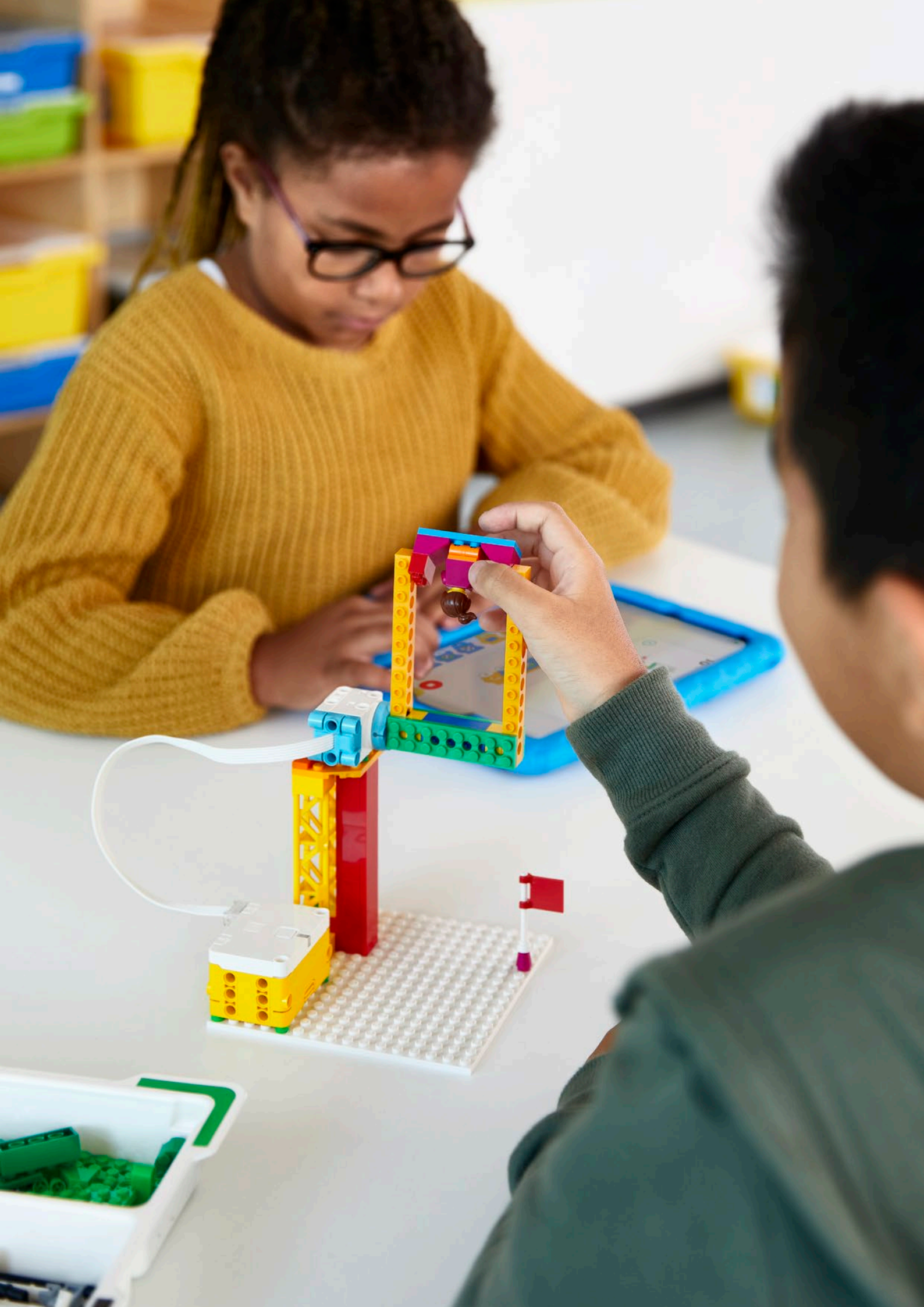
LEGO® Education SPIKE™ App for students included.



### Community

Learn & share with other teachers.





MEET MARIA, DANIEL,  
SOFIE AND LEO

CORE SET

# LEGO® Education SPIKE™ Essential Set

45345  1-3  449  6+ 

The four relatable Minifigures are a core component of the SPIKE Essential experience. Each one has different characteristics that students will identify with as they use storytelling to solve problems in an engaging and meaningful way. The four minifigures are called Maria, Daniel, Sofie and Leo and have their own personal biographies.

LEGO® Education SPIKE™ Essential is the cross-curricular STEAM solution for primary education. SPIKE Essential engages pupils in hands-on investigation of STEAM concepts while contributing to literacy, math, and social-emotional development. Curriculum-aligned learning units use everyday themes, relatable Minifigures with different personalities and familiar LEGO® building elements to solve problems through storytelling.

SPIKE Essential consists of a main classroom brick set with a wide variety of LEGO® elements and intelligent hardware, along with the intuitive SPIKE App, all of which is accompanied by a selection of unit plans and comprehensive online and in-app support.

SPIKE Essential excites students and delivers strong STEAM learning outcomes, developing their STEAM knowledge and practices, and 21<sup>st</sup> century skills.



## Delivering Strong Learning Outcomes

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SPIKE Essential offers 10 learning units of 8 × 45-minute, standards aligned STEAM lessons. Five of the units have a strong emphasis on science with 5 lessons each and 50 hours of science focused learning for 1 – 5 grade. In total SPIKE Essential is offering more than 70 lessons and more than 100 hours of learning. Each lesson includes comprehensive online lesson plans with language arts and math extensions. Assessment rubrics and videos to support teachers are also included. To further build teacher confidence in STEAM teaching using the LEGO Learning System, SPIKE Essential is supported by a comprehensive professional development program.



The lesson was really cool and interactive. My students got to problem-solve, build and use their hands - the kids who can't read were fine, too - and it incorporates technology, which is very motivating.



**3RD GRADE TEACHER, ROCKAWAY  
BOROUGH, NEW JERSEY, USA**



## LEGO® Education SPIKE™ Essential includes integrated *FIRST*® LEGO® League Explore unit

Through our partnership with *FIRST*® we offer the *FIRST* LEGO League Explore division for the primary school age range – the middle division of *FIRST* LEGO League. We co-develop and support the Explore program and events that bring awesome hands-on, problem-solving learning opportunities to students all over the world.

With the integrated unit for Explore, LEGO® Education SPIKE Essential extends its creative spirit inside the classroom and beyond it to robotics clubs, coding programs, afterschool clubs, and maker spaces. STEAM programs are a highly motivating and engaging way for students to develop and demonstrate their STEM skills. *FIRST* LEGO League Explore helps students learn the cooperation, collaboration, and teamwork skills they'll need to excel in a changing workforce.

The outcome of using SPIKE Essential with Explore is to help students learn building and programming skills they can apply in wider contexts. As a starting point, they learn to motorize a part of the model they build throughout the Explore season.

To learn the basics there are 3 lessons in the Explore Unit: Learn about Motors, Learn about Sensors, and Learn about Driving Robots. They are written in context with the Explore program. Each lesson provides 3 possible base models from the existing set of models, with one of them used in a full guided flow. The other model options provide a more challenging and varied experience for confident teams and coaches, or those already familiar with the set.

The minifigure characters as a *FIRST* LEGO League team in their treehouse Invention Lab to tie the SPIKE Essential narrative in with *FIRST* LEGO League Explore.

The Explore experience in the SPIKE Essential Unit is integrated into the Team Meeting Guide and Engineering Notebook. The Explore guidebooks prompt students to go further with the tasks in the app, providing specific challenges for the current season, tailoring their build to the season theme and real-world problems to be solved.

Join *FIRST* LEGO League  
in your region now  
[FIRSTLEGOleague.org](https://FIRSTLEGOleague.org)





SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH

## LEGO® Education BricQ Motion Essential

# Encourage Students to Discover Physical Science in Action

The LEGO® Education BricQ Motion Essential set engages primary students in the exploration of physical science within a sports context. This introductory STEAM experience offers standards-aligned lessons that include engaging videos and printable worksheets to excite and inspire students. Lesson plans, teacher videos, assessment rubrics, and math and language arts extensions are included to support and scaffold teachers.

## THIS SOLUTION INCLUDES



### 20+ Hours of Learning

Standards-aligned experiences ready for class.



### Resources

Classroom activities & technical support.



### 523 Elements

Including bricks, gears & springs



### Teacher Training

Free, online self-guided learning to help technical competency & pedagogy



### Community

Learn & share with other teachers.

CORE SET

# LEGO® Education BricQ Motion Essential Set

45401  2  523  6+ 

The LEGO® Education BricQ Motion Essential set engages primary students in the exploration of physical science within a sports context. BricQ Motion helps foster an understanding of forces, motion and interactions by providing easy hands-on learning experiences without the need for technology.

- Printed building instructions and replacement elements are included for easy classroom management.
- Numbered tiles facilitate visual math practice, making math more relevant, creative, and fun.



# LEGO® Education SPIKE™ Essential Elements

 6+

## LEGO® Technic™ Small Hub

**45609**

The advanced yet simple-to-use brick-shaped device features 2 input/output ports, Bluetooth connectivity, 6-axis gyro, and a rechargeable battery with micro USB charging and connection port, the Small Hub is at the heart of any SPIKE™ Essential model.



## LEGO® Technic™ Small Angular Motor

**45607**

Features a compact design profile and an integrated rotation sensor with absolute positioning and precise accuracy to bring LEGO® builds to life.



## LEGO® Technic™ 3x3 Color Light Matrix

**45608**

For use with LEGO Technic Hubs, each of the 9 pixels can be coded to display 10 different colors and 10 brightness levels for endless creative possibilities.



## LEGO® Technic™ Color Sensor

**45605**

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



## LEGO® Technic™ Small Hub Battery

**45612**

Rechargeable lithium-ion battery for use with the Technic Small Hub (45609). This 630 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 LEGO Technic Small Hub and LEGO Education SPIKE™ Essential Set (45345).



## 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

 6+

## LEGO® Education SPIKE™ Essential Replacement Pack 1

**2000722**

Keep your LEGO® Education SPIKE™ Essential Set (45345) in perfect working order with 97 spare LEGO elements. This set of replacement elements also ensures that you don't waste time hunting for lost pieces during class-time activities.



## LEGO® Education SPIKE™ Essential Replacement Pack 2

**2000727**

Ensure that your SPIKE™ Essential Set always has a complete set of minifigures with this replacement set of 4 minifigures.



Please contact your local distributor  
for information on classroom bundles  
[LEGOeducation.com](http://LEGOeducation.com)







SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH



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.



## LEGO® Education SPIKE™ Prime

# Building STEAM skills and confidence in Secondary school

Part of the LEGO® Learning System, LEGO® Education SPIKE™ Prime engages all students in thinking critically, analyzing data, and prototyping creative hands-on solutions for complex problems with real-world relevance. From easy-entry lessons to advanced experiences, students of all learning levels build their confidence and resilience along with the 21st-century skills that are vital to their future success. Flexible built-in scaffolding and competency-based professional development opportunities make it easy for teachers to get started and move from one unit to the next.

### SYSTEM REQUIREMENTS

LEGO® Education SPIKE™ Prime utilizes a 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](https://LEGOeducation.com/start)

## THIS SOLUTION INCLUDES



### 50+ Hours of Learning

Standards-aligned experiences ready for class.



### Resources

Classroom activities & technical support.



### 528 Elements

Including bricks, motors, sensors & hub.



### Professional Development

Teacher resources & getting started materials.



### Coding App

LEGO® Education SPIKE™ App for students included.



### Community

Learn & share with other teachers.

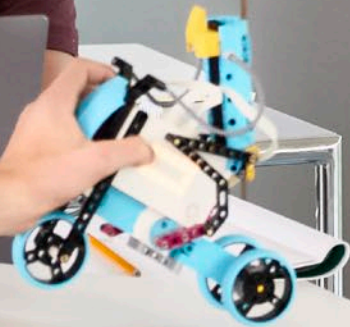


$$y = mx + b$$

$$E_t = E_k + E_p$$

Unit 2

Unit 1



# 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.

CORE SET

## LEGO® Education SPIKE™ Prime Set

**45678**



1-2



528



10+



The LEGO® Education SPIKE™ Prime Set is the go-to STEAM learning tool for secondary school students.

Combining colourful 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 21<sup>st</sup> century skills needed to become the innovative minds of tomorrow... while having fun!



## APP

# Intuitive app scales from easy-entry to limitless creative design

The SPIKE App is a student-facing app that can be used with both SPIKE Essential and SPIKE Prime to follow and complete lessons. The app includes "getting started" material, lessons, building instructions, and a series of coding experiences that progress from icon- and word-block coding based on Scratch to text-based coding based on Python.

## EXPANSION SET

# LEGO® Education SPIKE™ Prime Expansion Set

**45681**  604  10+ 

Inspire your secondary school students to explore more advanced creations and continue to nurture their interest in STEAM learning with the LEGO® Education SPIKE™ Prime Expansion Set (45681). It comes with over 600 LEGO elements, including large wheels, gear racks, a Color Sensor and Large Motor, plus a unique Maker Plate for easy building with your choice of single board computing (SBC) devices. The set also combines with the SPIKE Prime Set (45678) and free SPIKE App to launch students and teachers into the exciting world of robotics competitions, with over 10 hours of curriculum-based, competition-ready learning.



## REQUIRES ADDITIONAL PRODUCTS

LEGO® Education SPIKE™ Prime Set (45678)



SCIENCE,  
TECHNOLOGY,  
ENGINEERING,  
ART, MATH

LEGO® Education BricQ Motion Prime

## Encourage Students to Discover Physical Science in Action

Part of the LEGO® Learning System, LEGO® Education BricQ Motion helps foster an understanding of forces, motion, and interactions by providing easy hands-on learning experiences without the need for technology.

This introductory STEAM experience offers standards-aligned lessons that include engaging videos and printable worksheets to excite and inspire students. Teacher resources include lesson plans, teacher videos, assessment rubrics, and math and language arts extensions to support and scaffold teachers.

### THIS SOLUTION INCLUDES



#### 10+ Hours of Learning

Standards-aligned experiences ready for class.



#### Resources

Classroom activities & technical support.



#### 564 Elements

Including bricks, gears & springs.



#### Professional Development

Teacher resources & getting started materials.



#### Community

Learn & share with other teachers.

CORE SET

# LEGO® Education BricQ Motion Prime Set

**45400**  2  562  10+ 

The LEGO® Education BricQ Motion Prime Set engages secondary students in the exploration of physical science within a sports context.

BricQ Motion helps foster an understanding of forces, motion, and interactions by providing easy hands-on learning experiences without the need for technology.

- Printed building instructions and replacement elements are included for easy classroom management.
- With the numbered foils, students can easily gather data on variables, angles, heights, and lengths to support their analysis and synthesis.



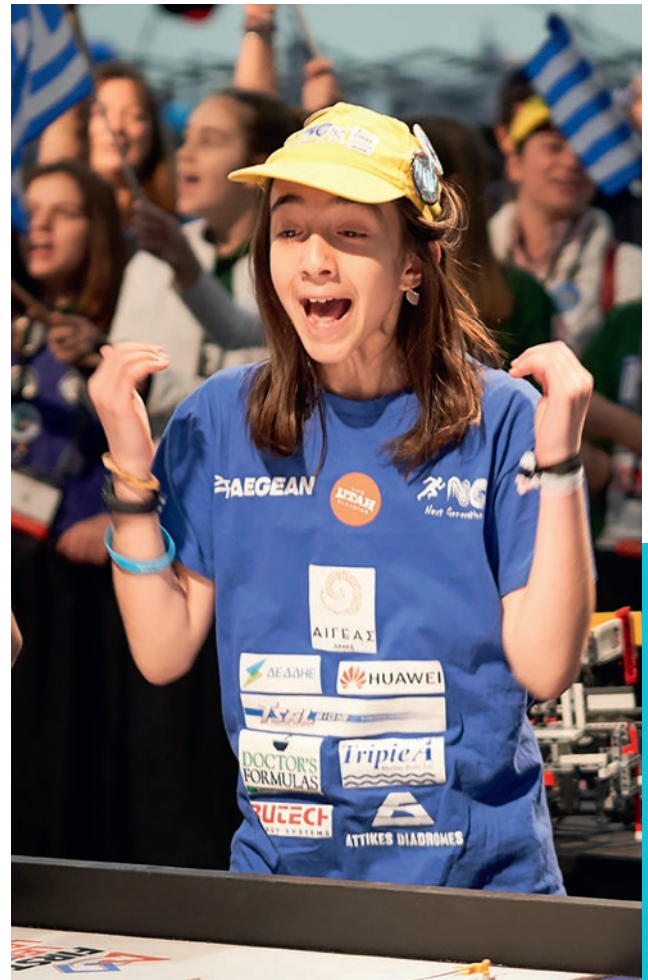
# The proven impact of *FIRST*<sup>®</sup> LEGO<sup>®</sup> League

***FIRST*<sup>®</sup> LEGO<sup>®</sup> League introduces science, technology, engineering, and math (STEM) to children ages 4–16 through fun, exciting hands-on learning.**

Through the program, we aim to ensure that we are having a lasting, positive impact on participants across all demographic groups. The rigorous multi-year longitudinal study, conducted by Brandeis University Center for Youth and Communities, provides strong evidence that participation in *FIRST* LEGO League does just that. Even with just one year of participation, study participants are 2–3x more likely to have gains in STEM awareness, skills, and intent, than a comparison group of peers not participating in *FIRST* programs. Besides general findings on gains in STEM Awareness, 21st Century skills, and confidence – across all three *FIRST* LEGO League divisions, Brandeis University has conducted additional research on several focus areas.

## Impact on girls and young women

Women are critical to the advancement of STEM (Science, Technology, Engineering, and Math) – but a significant gender gap remains within STEM careers. Through our partnership with *FIRST*, we are actively developing ways to address barriers to access and participation, particularly in managing and allocating resources, programs, and educational opportunities fairly to all genders.



## STEM Outcomes

Female *FIRST* participants are 2.2 times more likely to have significantly stronger STEM interest than comparison group peers, and:

**MORE LIKELY TO HAVE SIGNIFICANTLY STRONGER OUTCOMES IN STEM ATTITUDES, KNOWLEDGE, AND INTERESTS COMPARED TO THEIR PEERS**

"x" = times as likely

Learn more about the study  
[FIRSTinspires.org/impact](https://FIRSTinspires.org/impact)



# 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

 107  10+

## LEGO® Education SPIKE™ Prime Replacement Pack

**2000719**

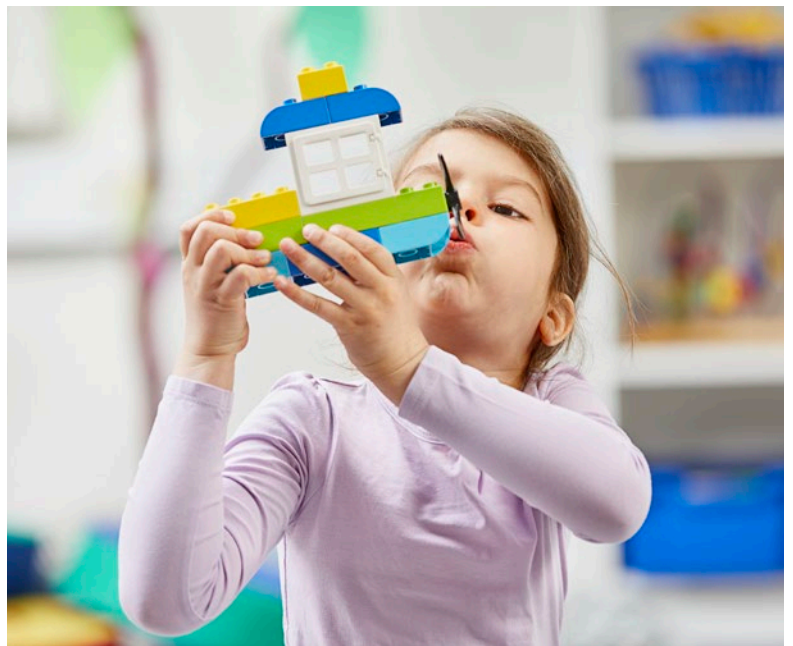
Keep your LEGO® Education SPIKE™ Prime Set (45678) in perfect working order with the LE Replacement Pack Prime. With over 100 LEGO Technic™ and System elements, this replacement pack means you won't waste precious classroom time searching for missing pieces.



Please contact your local distributor for information on classroom bundles  
[LEGOeducation.com](http://LEGOeducation.com)

# How can LEGO® Education support you?

LEGO® Education is here to help you every step of the way to ensure a successful STEAM journey for both educators and students.



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**Our solutions are backed by a commitment to sustainability, safety, and quality, including:**

- Active involvement in sourcing sustainable plastic, reducing CO<sub>2</sub> emissions, and targeting zero waste
- Compliance with stringent safety standards
- Strictest policies for safeguarding online privacy
- Adherence to all national and international requirements governing play materials
- A deep commitment to both product quality and ethical values



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**LEGO Education helps you deliver all the benefits of hands-on STEAM learning, giving your students a great start to developing 21st century skills with:**

- A system of interconnected solutions
- Intuitive LEGO® brick sets & apps for a range of devices
- A progression of STEAM lessons and activities aligned to national standards
- Competitions and after-school programs



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**We support you in streamlining and integrating playful learning experiences into your existing curriculum by providing:**

- Embedded unit plans for instant availability
- Tools and rubrics for assessing students' progress
- Free online professional development and opportunities for in-person training
- Online and phone technical support

Start your learning journey now  
[LEGOeducation.com](https://LEGOeducation.com)



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Boston, MA 02116



Find more information about  
**LEGO® Education solutions at our website**  
[LEGOeducation.com](https://www.LEGOeducation.com)

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