



LEGO® Education 2023 Solution Guide





A Note From New LEGO® Education President, Victor Saeijs

I am delighted to present this newest edition of the LEGO® Learning System catalog, and my first as President of LEGO® Education. It is a privilege to join a team so dedicated to improving the lives of students all over the world. I am excited to further that mission, and continue the vital work of inspiring students and preparing them for life and work in the 21st century. Learning through play sounds simple but the impact is profound especially at a moment in time where it has never been more critical for us to reignite the joy in learning.

We know that when learning is joyful it is meaningful, motivating, and engaging. After two years of disruption and disconnect both teachers and students deserve the unique joy that comes from learning through play. Of course the return to in person learning brings with it many challenges, but it also offers the unprecedented opportunity to collectively rethink the way we teach and learn.

When students are excited, engaged and motivated to learn, their teachers feel the same. This is the thread that connects all we do at LEGO® Education. We know that STEAM learning through purposeful play has proven to not only increase outcomes, retention, and understanding of concepts, it also fosters a life-long love of learning in a way that nothing else can.

Happy building,



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

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 PLANS 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.
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ADDITIONS

EXPANSION SETS & UNIT PLANS Additional unit plans and brick expansion sets to help take the LEGO® Education experience to the next level.	PROFESSIONAL DEVELOPMENT Facilitated product training with a LEGO® Education certified trainer	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



Start your learning journey now
LEGOeducation.com

Building Confident Lifelong Learners

In an everchanging world where the pace of technological change means most younger students are preparing for jobs that don't exist yet, the ultimate goal for LEGO® Education is to future-proof students' skills and inspire them to become confident, lifelong learners. In order to achieve this goal, educators must meet students where they are, challenge them appropriately and allow them the opportunities to experience meaningful failures they can learn from.

LEGO Education helps students by encouraging hands-on experimentation and applying STEAM knowledge to solve real-world problems. This experimentation and problem-solving builds students' confidence, the desire to keep trying new things and ultimately achieve more than they ever thought possible.

A Learning Journey with LEGO® Education

In order to prepare students, we must go beyond foundational skills and focus on development of the whole child. 21st century skills like communication, collaboration, problem-solving and creativity are among the most critical skills for participation in the workforce of the future.

Learning doesn't end with a single lesson, but is the result of a lifelong journey, which is why LEGO Education offers learning experiences that provide a way for students to naturally discover and engage in purposeful play. Purposeful play is rooted in pedagogical approaches such as project-based learning, which are known to increase student learning outcomes and foster a love of learning.

A Toolbox to Unlock Unlimited Possibilities

The LEGO® Learning System is built on the back of more than 40 years of developing innovative STEAM learning experiences. The integrated solutions work seamlessly together beginning as early as kindergarten, unlocking deeper learning, and providing students with a progression of skills they can build on year over year. It is our answer to the call to rethink learning and it is always evolving to meet students and teachers where they are.



The LEGO® Learning System

A system of integrated and scalable components



Curriculum

Engage all students with playful STEAM curriculum units.



Bricks

Build, tinker, and experiment with a system of LEGO® brick elements.



Programming

Learn and apply coding principles within a STEAM context.



Hardware

Expand learning opportunities with LEGO® hardware elements.



Professional Development

Develop teachers' confidence and competence.

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.



Secondary

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.



LEGO Education SPIKE - L1.0

View Window Help

This is uphill

Variables

Make a variable

Make a List

Line Graph

More Motors

Lesson

Variables

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?

Engage every student in STEAM Learning



Hands-on STEAM learning places a strong emphasis on iteration. We apply that same iterative approach to our solutions. We are constantly looking for ways to innovate and optimize the learning experience.

The newest version of our LEGO® Education SPIKE™ App is more intuitive for teachers with faster hub connection and update times and support for bigger programs. And students get a more exciting and fun experience with more precise motor movement and enhanced programming possibilities that bring models to life with more accuracy and predictability than ever before.

Start your learning journey now
→ LEGOeducation.com/downloads



Confident Teachers Develop Confident Students

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

Competency-Based Framework

Our professional development program is founded on a competencybased framework that's rooted in four core competency categories: Pedagogy, STEAM Concepts, 21st Century Skills, and Classroom Management. These critical competencies enable teachers to fully realize the learning promises of every LEGO® Education solution, giving them the skills they need to facilitate lessons that drive student learning outcomes.

Personalized Professional Development

A selection of self-guided and facilitated learning is offered virtually and on-site. This flexible, comprehensive professional development program builds teachers' confidence and prepares them to foster student success.

Self-Guided Learning

This free, online, on-demand, self-guided learning targets teachers' individual needs and learning preferences. Using instructional product training videos and interactive competency-based courses, teachers can practice core competencies in Pedagogy, 21st Century Skills, STEAM Concepts, and Classroom Management, and become confident facilitators of playful, hands-on STEAM learning.

Facilitated Learning

These full-day product training courses are led 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.

Plan Your Learning

Teachers can download "Plan Your Learning" to understand and track their competency-based learning. Coding and Computational Thinking support materials help teachers succeed with LEGO Education solutions.

Start your learning journey now
→ LEGOeducation.com/Teach



Inspiring the Next Generation with **FIRST**[®] **LEGO**[®] League

FIRST[®] LEGO[®] League guides youth through STEAM learning and exploration at an early age. From Discover, to Explore, and then to Challenge, students will understand the basics of STEAM and apply their skills in an exciting competition while building habits of learning, confidence, and teamwork skills along the way.

Throughout the strategic partnership with *FIRST*, LEGO Education proudly develops and supports programs and events that bring these learning opportunities to students all over the world.

679,000+
Participants

3,700+
Events

110+
Countries



FIRST[®] and the *FIRST*[®] logo are trademarks of For Inspiration and Recognition of Science and Technology (*FIRST*). *FIRST*[®] LEGO[®] League is a jointly held trademark of *FIRST* and the LEGO Group. ©2023 *FIRST*[®] and the LEGO Group. All rights reserved.



DISCOVER

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



EXPLORE

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



CHALLENGE

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
3 program divisions
FIRSTLEGOleague.org





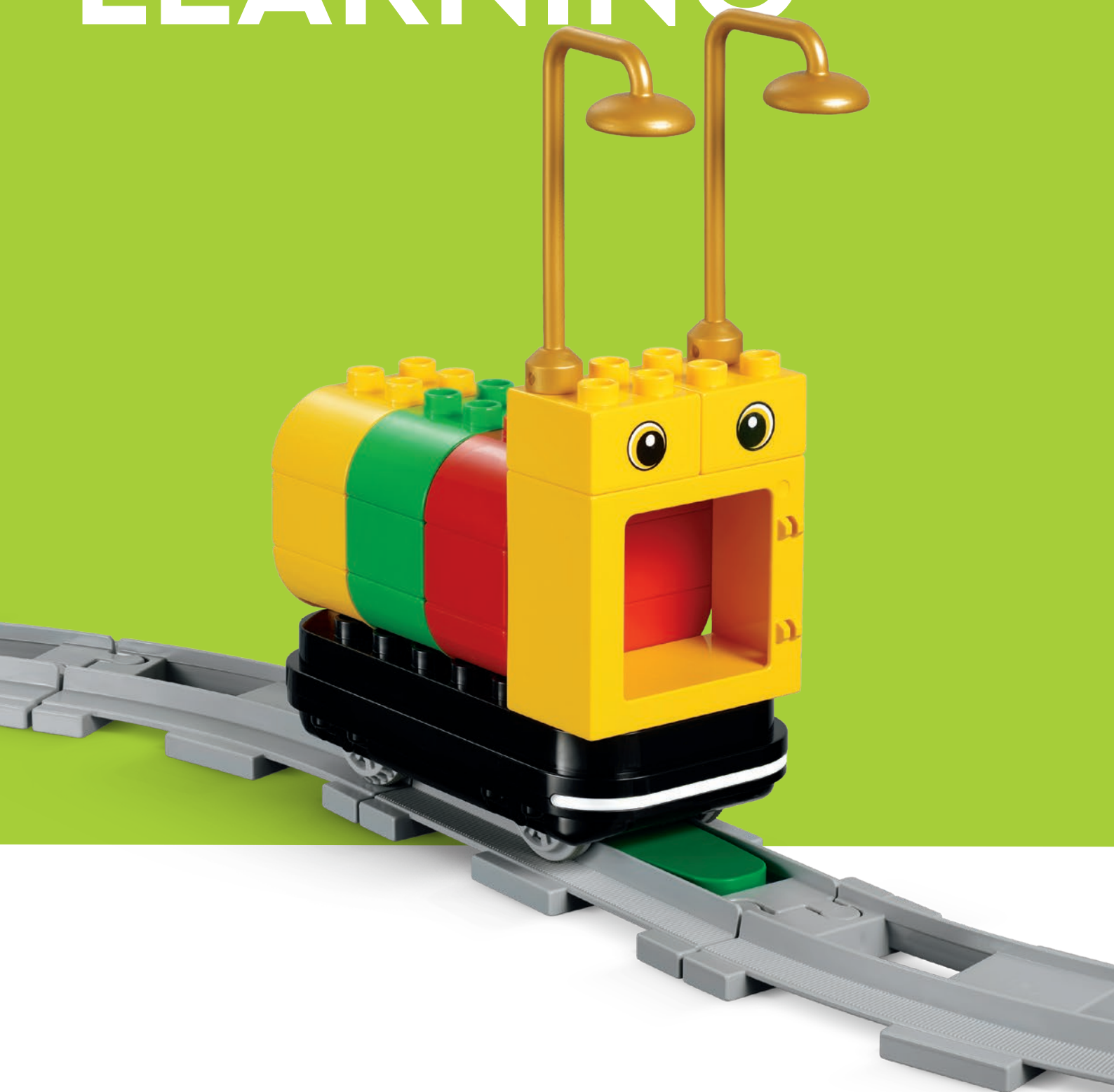
World Robot Olympiad™ exists to ignite a passion for STEM in every child, regardless of their language, background, or opportunities.

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.



EARLY LEARNING





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.

SOLUTIONS INCLUDE:

CORE

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

UNIT PLANS

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

Some lessons are also aligned to Kindergarten standards from NGSS, CTSA and Common Core.

SUPPORT

- Getting Started Material
- Inspiration Cards
- Lesson Plans

ADDITIONS

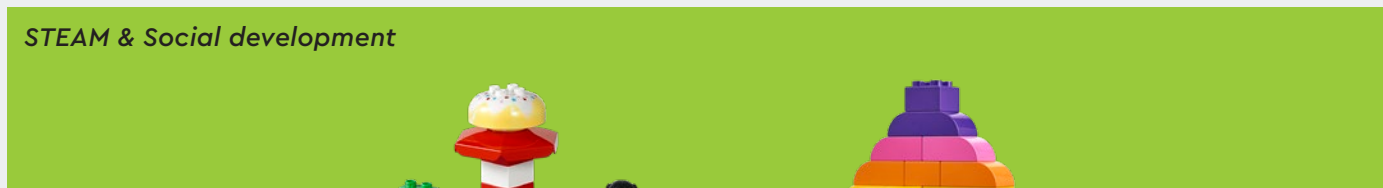
PROFESSIONAL DEVELOPMENT

ACCESSORIES

REPLACEMENT PACKS

Learning solutions

Start the STEAM learning and develop social skills



STEAM & Social development

STEAM Park

- Lessons: 8
- Up to 8 children

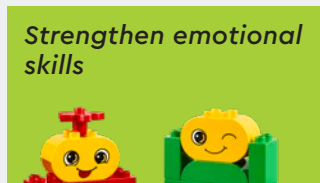


My XL World

- Lessons: 8
- Up to 10 children



Focus on individual skills

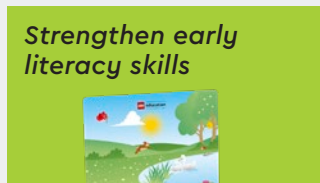


Strengthen emotional skills



Build Me "Emotions"

- Lessons: 12
- Up to 6 children

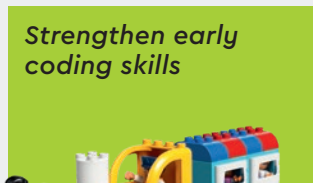


Strengthen early literacy skills



StoryTales

- Lessons: 8
- Up to 4 children

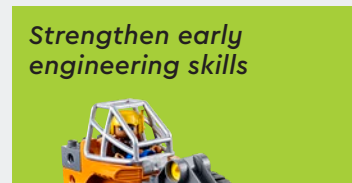


Strengthen early coding skills



Coding Express

- Lessons: 8
- Up to 6 children



Strengthen early engineering skills

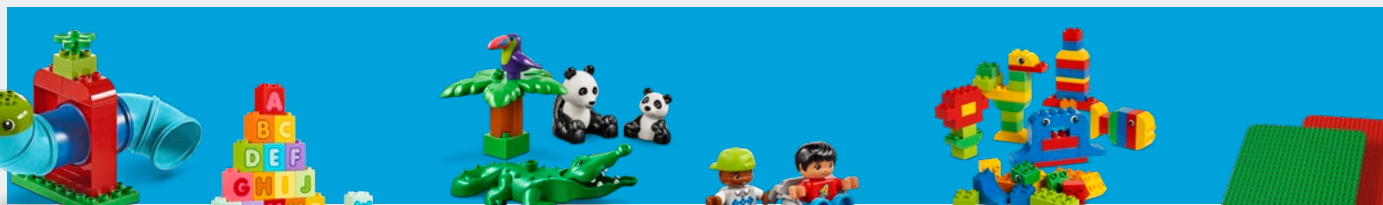


Tech Machines

- Lessons: 8
- Up to 6 children

Booster Sets

Add fun with booster sets



Tubes

Letters

Animals

People

Creative
LEGO® DUPLO®
Brick Set

Building
Plates

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 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.

KEY LEARNING VALUES

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

Full-day professional development course as add-on

Online unit plan with 8 lessons

Inbox material:

- 295 DUPLO bricks, including gears, tracks, pulleys, boats, and figures
- Getting Started activity card
- 8 double-sided inspiration cards





Coding Express

45025

1-6

234

2-5

✓ EARLY CODING

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.

KEY LEARNING VALUES

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

App with four areas for further exploration:

- Journeys, Characters, Music, and Math

Full-day professional development course as add-on

Online unit plan with 8 lessons

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





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



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

Full-day professional development course as add-on

Online unit plan with 8 lessons

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



My XL World

45028

1-10

480

2-6

✓ FOCUS ON SOCIAL SKILLS

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.

KEY LEARNING VALUES

- Collaboration
- Role play
- Roles and responsibilities

Full-day professional development course as add-on

Online unit plan with 8 lessons

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



Build Me "Emotions"

45018

1-6

188

3-5



FOCUS ON EARLY EMOTIONAL SKILLS

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.

KEY LEARNING VALUES

- Vocabulary
- Self-efficacy
- Empathy
- Problem-solving

Full-day professional development course as add-on

Online unit plan with 12 lessons

Inbox material:

- 188 LEGO® DUPLO® bricks including unique elements with various facial expressions
- Getting Started activity card
- 8 double-sided inspiration cards



Tech Machines

45002

1-6

95

3-6



**FOCUS ON
ENGINEERING SKILLS**

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.

KEY LEARNING VALUES

- Fine-motor skills
- Problem-solving
- Engineering

**Full-day professional
development course as
add-on**

**Online unit plan with 8
lessons**

Inbox material:

- 95 LEGO® DUPLO® bricks including 4 screwdrivers and many unique elements
- Getting Started activity card
- 6 inspiration cards



Tubes

45026

1-6

150

3-6

✓ BOOSTER PACK

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

✓ BOOSTER PACK

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

✓ BOOSTER PACK

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

✓ BOOSTER PACK

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+

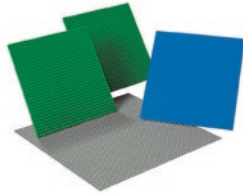
Accessories

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+

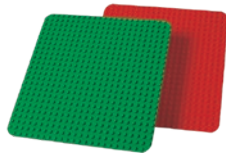


Large LEGO® DUPLO® Building Plates

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

PRIMARY





SCIENCE,
TECHNOLOGY,
ENGINEERING,
ART, MATH



CODING

CODE CONFIDENTLY

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



LEGO® Education SPIKE™ Essential

Ignite Primary School Students' Passion for STEAM Learning

LEGO® Education SPIKE™ Essential ignites primary school students' interest in STEAM learning through playful, hands-on learning experiences. Part of the LEGO® Learning System, SPIKE™ Essential encourages students to investigate STEAM concepts using everyday themes, relatable minifigures and storytelling to solve problems while contributing to literacy, math, and social-emotional development.

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

THE SOLUTION INCLUDES:

CORE SET

LEGO® Education SPIKE™ Essential Set
LEGO® Education SPIKE™ App

UNIT PLANS

Amazing Amusement Park
Great Adventures
Quirky Creations
Happy Traveler
Creative Carnival Games
1 "Competitions" Unit
Essential Combined (This unit combines SPIKE Essential and BricQ_Motion Essential)
Science (5 dedicated science units for grades 1-5)

SUPPORT

Getting Started Material
Lesson Plans
Assessment Tools
Self-Guided Professional Development

ADDITIONS

PROFESSIONAL DEVELOPMENT

Facilitated product training with a LEGO® Education certified trainer

LEARNING CAN HAPPEN ANYWHERE

Used in combination with the SPIKE essential classroom set, Personal Learning Kits can facilitate learning wherever it happens – in the classroom or remotely.



MEET MARIA, DANIEL,
SOFIE AND LEO

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.

CORE SET

LEGO® Education SPIKE™ Essential Set

45345

1-3

449

6+



This 449-piece set comes with 4 minifigures with their own personalities to facilitate storytelling opportunities. Icon- and word-based block coding with simple hardware – including an intelligent 2-port Hub, 2 Small Motors, a Light Matrix, and a Color Sensor – bring students' creations to life. The set also includes a colorful selection of familiar and age-appropriate LEGO bricks, replacement elements, and a durable storage box with color-coded sorting trays to ease the building process and classroom management.

KEY LEARNING VALUES

- Explore the engineering design process, including defining a problem, brainstorming solutions, and testing and refining prototypes.
- Investigate the scientific concepts of energy, energy transfer, and collision.
- Develop computational thinking skills, including creating and modifying sequences, testing, debugging, and using loops.
- Strengthen oral communication skills as students discuss their experiences collaboratively.
- Engage in problem-solving through storytelling.
- Develop social-emotional language by helping a main story character solve a problem.



Delivering Strong Learning Outcomes

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.



UNIT PLANS

⌚ 45 min

SPIKE ESSENTIAL SET

GREAT ADVENTURES 6

Creating Interactive Stories

AMAZING AMUSEMENT PARK 6

Engineering a Fun Day Out

HAPPY TRAVELER 6

Programming Your Way Around Town

CRAZY CARNIVAL GAMES 7

Playing with Energy Transfer and Collision

QUIRKY CREATIONS 6

Engineering Cool School Hacks

SCIENCE 5

5 dedicated science units for grades 1–5

FIRST® LEGO® League Explore

SPIKE Essential includes a unit written specifically for FIRST® LEGO® League Explore.



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





SCIENCE,
TECHNOLOGY,
ENGINEERING,
ART, MATH



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



3RD GRADE TEACHER
BARRINGTON, ILLINOIS

LEGO® Education BricQ Motion Essential

Encourage Students to Discover Physical Science in Action

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

THE SOLUTION INCLUDES:

CORE SET

LEGO® Education BricQ Motion Essential Set

UNIT PLANS

Train To Win (Lower Primary)

Winning With Science (Upper Primary)

Essential Combined (This unit combines BricQ Motion Essential and SPIKE Essential)

SUPPORT

Getting Started Material

Lesson Plans

Assessment Tools

Self-guided Professional Development

ADDITIONS

PROFESSIONAL DEVELOPMENT

Facilitated product training with a LEGO® Education certified trainer

LEARNING CAN HAPPEN ANYWHERE

Used in combination with the BricQ Motion Essential classroom set, Personal Learning Kits can facilitate learning wherever it happens — in the classroom or remotely

CORE SET

LEGO® Education BricQ Motion Essential Set

45401



2



523



6+



This 523-piece set includes a variety of easy-build elements, gears, weight bricks, springs, 4 minifigures and more, while color-coded sorting trays ease the building process and make tidying up at the end of class quick and efficient.

Replacement elements are also included, as well as 2 printed building instruction booklets with inspirational ideas that help students discover physical science in action, even those who have never built with LEGO bricks before.

KEY LEARNING VALUES

- Investigate push and pull forces and use evidence to solve problems.
- Apply scientific inquiry skills to show how the forces acting on an object can change its motion.
- Practice application of cause and effect & balanced and unbalanced forces to design, develop and optimize a solution.
- Strengthen oral communication skills as students participate in collaborative conversations to present their ideas.

UNIT PLAN, LOWER PRIMARY

Train to Win



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

🕒 45-90 min 📖 7-8

UNIT PLAN, UPPER PRIMARY

Winning with Science



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

🕒 45-90 min 📖 7-8



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

SECONDARY





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.



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

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.

THE SOLUTION INCLUDES

SET & APP

LEGO® Education SPIKE™ Prime Set
LEGO® Education SPIKE™ App

UNIT PLANS

Invention Squad
Kickstart a Business
Life Hacks
Training Trackers
Prime Combined (This unit combines SPIKE Prime and BricQ_Motion Prime)

SUPPORT

Getting Started Material
Lesson Plans
Assessment Tools
Self-guided Professional Development

ADDITIONS

EXPANSION SET

LEGO® Education SPIKE™ Prime Expansion Set

UNIT PLANS

Competition Ready

ACCESSORIES & REPLACEMENT PACKS

PROFESSIONAL DEVELOPMENT

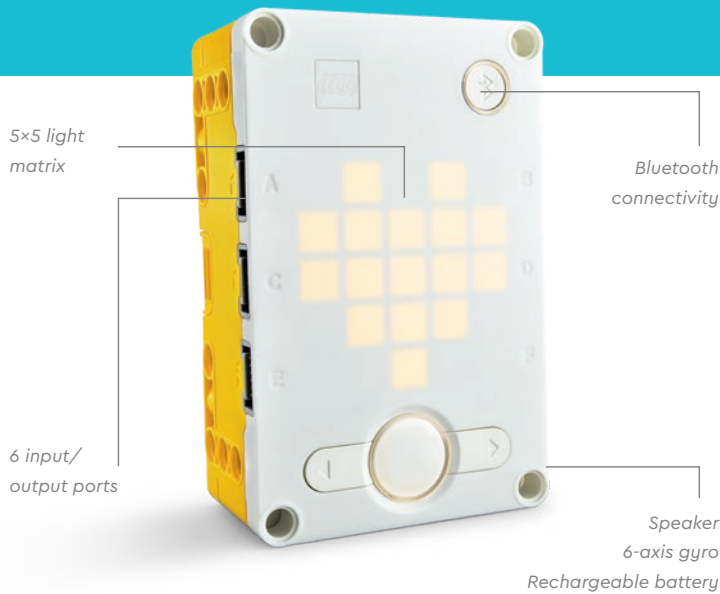
Facilitated product training with a LEGO® Education certified trainer

LEARNING CAN HAPPEN ANYWHERE

Used in combination with the SPIKE Prime classroom set, Personal Learning Kits can facilitate learning wherever it happens – in the classroom or remotely



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 grade 6–8 students.

Combining colorful LEGO building elements, easy-to-use hardware, and an intuitive drag-and-drop coding language based on Scratch, SPIKE Prime continuously engages students through playful learning activities to think critically and solve complex problems, regardless of their learning level.

From easy-entry projects to limitless creative design possibilities, including the option to explore text-based coding with Python, SPIKE Prime helps students learn the essential STEAM and 21st century skills needed to become the innovative minds of tomorrow... while having fun!

KEY LEARNING VALUES

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



APP

Intuitive app scales from easy-entry to limitless creative design

In addition to the 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 in grades 6–8 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.

UNIT PLANS

🕒 45–90 min

SPIKE PRIME SET

INVENTION SQUAD

Explore engineering.

📄 5

KICKSTART A BUSINESS

Investigate computer science.

📄 6

LIFE HACKS

Practically apply data.

📄 7

TRAINING TRACKERS

Graph and analyze data.

📄 7

SPIKE PRIME EXPANSION SET

COMPETITION READY

Use curiosity and teamwork.

📄 8

EXPANSION SET

LEGO® Education SPIKE™ Prime Expansion Set

45681



6074



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.

KEY LEARNING VALUES

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



REQUIRES ADDITIONAL PRODUCTS

LEGO® Education SPIKE™ Prime Set (45678)



SCIENCE,
TECHNOLOGY,
ENGINEERING,
ART, MATH



I try to place as many real-world experiences as possible in front of my students because I believe that hands-on learning pushes critical thinking skills.



MINDY BISSETT

K-8 LEAD COMPUTER SCIENCE
TEACHER, ARKANSAS

LEGO® Education BricQ Motion Prime

Encourage Students to Discover Physical Science in Action

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THE SOLUTION INCLUDES

CORE

LEGO® Education BricQ Motion Prime Set

UNIT PLANS

Science of Sports

Prime Combined (This unit combines BricQ Motion Prime and SPIKE Prime)

SUPPORT

Getting Started Material

Lesson Plans

Assessment Tools

Self-guided Professional Development

ADDITIONS

PROFESSIONAL DEVELOPMENT

Facilitated product training with a LEGO® Education Certified Trainer

LEARNING CAN HAPPEN ANYWHERE

Used in combination with the BricQ Motion Prime classroom set, Personal Learning Kits can facilitate learning wherever it happens – in the classroom or remotely

CORE SET

LEGO® Education BricQ Motion Prime Set

45400  **2**  **562**  **10+** 

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

KEY LEARNING VALUES

- Investigate push and pull forces and use evidence to solve problems.
- Apply scientific inquiry skills to show how the forces acting on an object can change its motion.
- Practice application of cause and effect & balanced and unbalanced forces to design, develop and optimize a solution.
- Strengthen oral communication skills as students participate in collaborative conversations to present their ideas.

UNIT PLAN, SECONDARY

Science of Sports



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

 **45-90 min**  **7-8**



The proven impact of FIRST® LEGO® League

FIRST® LEGO® 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.

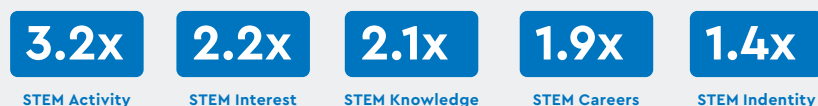


FIRST has made such a large impact on my life that I don't know where or who I would be without it. I have been involved with FIRST for seven years, and the experiences that I have had have given me public speaking skills, confidence in my abilities, and life-long friendships. FIRST also has given me the opportunity to inspire others in STEAM fields.

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



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

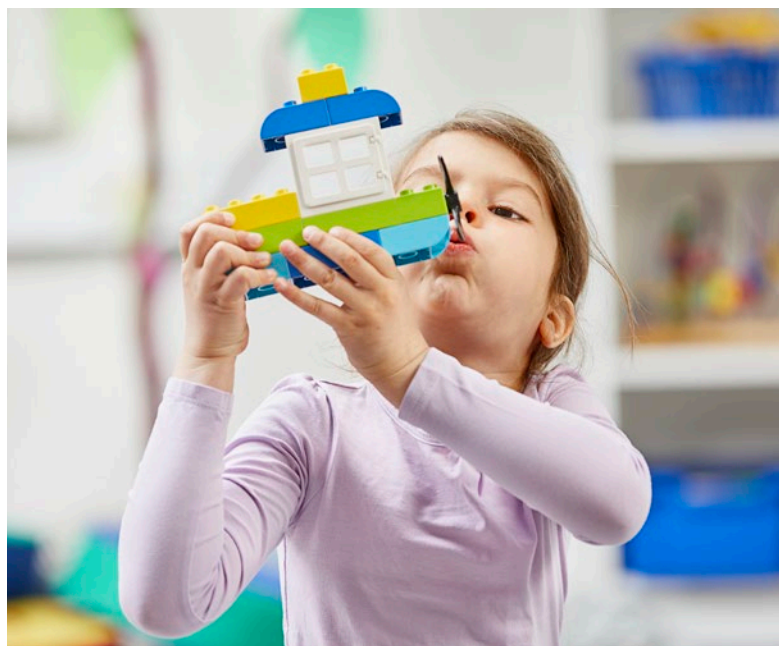
Keep your LEGO® Education SPIKE™ Prime Set (45678) in perfect working order with the LE Replacement Pack Prime. With over 100 LEGO Technic™ and System elements, this replacement pack means you won't waste precious classroom time searching for missing pieces.



→ Please contact your local distributor for information on classroom bundles
LEGOeducation.com

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.



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

- Active involvement in sourcing sustainable plastic, reducing CO₂ 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



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



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





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

Follow us on

