





**Science says STEM learning should start early and continue every year.** Kid Spark’s Pre-K - 1 STEM Program helps young students develop important competencies that are a prerequisite to all STEM learning. We recommend schools implement at least one (1) Kid Spark unit of instruction per grade level so students can continue to develop a lasting interest in STEM.





## Units of Instruction

There are a total of four units of instruction included in Kid Spark’s Pre-K - 1 STEM program. Each unit of instruction includes a unit overview, four lesson plans, and a unit assessment. Most lessons average 30 - 35 minutes and include opportunities for students to apply what they have learned through creative challenges.

-  It's All About the Blocks
-  I Am an Engineer
-  Making Things Strong
-  Making Things Move





## Sample Implementation Plan

Below is an example of how Kid Spark’s Pre-K - 1 STEM Program might be implemented across grade levels. Ultimately, each school can decide which units of instruction to offer at certain grades. Kid Spark units are progressive which means educators have the ability to meet the needs of any student regardless of age or skill level.

Grade	Kid Spark Unit	Lessons & Assessments	Minimum Time Required
Pre-K	 It's All About the Blocks	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
K	 I Am an Engineer	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
1	 Making Things Strong	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
	 Making Things Move	4 Lessons, 1 Assessment	(5) 30-Minute Sessions

## Plan Your Program

Listed below are the available units of instruction in Kid Spark's Pre-K - 1 Program. Determine which units of instruction will be offered at each grade level and the dates in which they will be implemented.

	It's All About the Blocks	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
	I Am an Engineer	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
	Making Things Strong	4 Lessons, 1 Assessment	(5) 30-Minute Sessions
	Making Things Move	4 Lessons, 1 Assessment	(5) 30-Minute Sessions

Grade	Instructor	Kid Spark Unit	Implementation Schedule
Pre-K	Mrs. Spark	It's All About The Blocks	3/5/2021 - 4/9/2021 - 5 (30) minute sessions
Pre-K			
Pre-K			
Pre-K			
K			
K			
K			
1			
1			
1			

## Preparing For Instruction

We recommend educators complete the following steps prior to instruction:

**Determine which Kid Spark units of instruction will be offered at each grade level.**

See page 1 for sample implementation plan and minimum time requirement for each unit. Complete the Plan Your Program worksheet on page 2.

**Review the unit overview(s) for all of the units you will be responsible for teaching.**

Unit Overviews can be found on pages 4 - 11.

**Review lesson content.**

We highly recommend educators get hands-on with the lessons they will be responsible for teaching. All of the curriculum for Kid Spark's Pre-K - 1 STEM Program can be found in the printed instructional booklets that are included in the Foundational Fluencies STEM Lab.

**Review unit assessments.**

Each Kid Spark unit includes a unit assessment that can be used to evaluate student learning. Unit assessments can be found in the printed Instructor's Guide booklets that are included in the Foundational Fluencies STEM Lab.

**Complete the following online professional learning courses:**

- Kid Spark Program Orientation
- Grades Pre-K - 1

Note: After successfully completing all of these courses, educators will receive their Kid Spark Pre-K - 1 program certification. All courses can be found online by visiting: [kidsparkeducation.org/professional-learning](https://kidsparkeducation.org/professional-learning).

**Make sure all STEM Labs are inventoried and ready to go.**



## Unit Overview:

This unit is designed to introduce young students to Kid Spark's ROK Blocks during short learning experiences. By focusing their attention on each of the four basic ROK Blocks, students will learn the properties and function of each and be better able to use them in their own creative designs, in future lessons, and free play. The lessons are intended to ensure students experience success immediately.

### Recommended Grade Level:

Pre-K - 1

### Kid Spark STEM Lab:

Foundational Fluencies

## Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the Common Core Standards in Math (CCS-MA).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Scientific and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young children.
- ⚙️ Common Core Standards in Math help teachers integrate ROK Block experiences with math curriculum and to help build a continuum of engineering learning from preschool to the primary grades.

Lessons	NGSS DCI	NGSS SEP	NGSS CCC	CCS-MA
<b>Lesson 1: The Big Yellow Block (20-30 Min.)</b> In this lesson, students will observe the features and characteristics of the Yellow ROK Block. Students will also practice connecting and disconnecting blocks.	Engineering design	Asking questions & defining problems	Structure & function	Identify & describe shapes
<b>Lesson 2: The Little Blue Block (20-30 Min.)</b> In this lesson, students will observe the characteristics of the Blue ROK Block, compare and contrast blocks of different sizes and shapes, and apply what they have learned to create something new.	Engineering design	Developing & using models	Scale, proportion, & quantity	Count to tell the number of objects
<b>Lesson 3: The Angled Red Block (20-30 Min.)</b> In this lesson, students will observe the features and attributes of the Red ROK Block. Students will also practice connecting the blocks to make curves and arches.	Engineering design	Using mathematics	Structure & function	Compare numbers
<b>Lesson 4: The Medium Green Block (20-30 Min.)</b> In this lesson, students will explore the different features and attributes of the Green ROK Block. Students will compare and contrast the four ROK Blocks, then use the blocks to create something new.	Engineering design	Developing & using models	Scale, proportion, & quantity	Analyze, compare, & compose shapes

### Unit Assessment: It's All About The Blocks

In this educator-led assessment, students will get hands-on with Kid Spark engineering materials as they demonstrate their understanding of the core ideas and concepts that were covered throughout this unit.

## Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Arch	Double	Rectangle	Small(er/est)
Big(ger/gest)	Half	Rectangular Prism	Square
Circle	Large(r/st)	Round	Symmetry
Compare	Long(er/est)	Separate	Tall(er/est)
Cube	Medium	Short(er/est)	Twice
Curve	Pyramid	Size	

## Recommended Children's Literature

The following books can be used to support the concepts presented throughout this unit.

**"Not a Box"** by Antoinette Portis

**"Build It! Structures, Systems and You"** by Adrienne Mason

**"Give Me Half!"** by Stuart Murphy

**"Shapes Are Everywhere!"** by Charles Ghigna



## Get Engaged!

Visit our community page at [kidsparkeducation.org/community](https://kidsparkeducation.org/community) for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.

## Unit Overview:

Some students grow up knowing an engineer. Most do not. Or, the engineers they know are different from them in gender, race, or other demographic characteristics. This unit demonstrates to students that we all use engineering every day, and extends their engineering skills working with Kid Spark engineering materials.

### Recommended Grade Level:

Pre-K - 1

### Kid Spark STEM Lab:

Foundational Fluencies

## Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the Common Core Standards in Math (CCS-MA).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Scientific and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young children.
- ⚙️ Common Core Standards in Math help teachers integrate ROK Block experiences with math curriculum and to help build a continuum of engineering learning from preschool to the primary grades.

Lessons	NGSS DCI	NGSS SEP	NGSS CCC	CCS-MA
<b>Lesson 1: What Is An Engineer? (30-35 Min.)</b> In this lesson, students will learn about engineers and what they do. Students will create measurement tools to help their instructor solve a challenge.	Engineering design	Using mathematics	Scale, proportion, & quantity	Describe & compare measurable objects
<b>Lesson 2: Patterns &amp; Pyramids (30-35 Min.)</b> In this lesson, students learn how to think like an engineer. Students will explore patterns and symmetry as they build different structures and designs.	Engineering design	Developing & using models	Patterns	Count to tell the number of objects
<b>Lesson 3: What's In The Lab? (30-35 Min.)</b> In this lesson, students will explore the engineering materials that are included in the ROK Blocks Mobile STEM Lab and become familiar with the name and function of each component.	Engineering design	Asking questions & defining problems	Structure & function	Compare numbers
<b>Lesson 4: Free Build (30-35 Min.)</b> In this lesson, students are free to create something of their own design. Students can use the skills they have learned throughout previous lessons to build and improve a custom design.	Engineering design	Developing & using models	Structure & function	Analyze, compare, & compose shapes

### Unit Assessment: I Am An Engineer

In this educator-led assessment, students will get hands-on with Kid Spark engineering materials as they demonstrate their understanding of the core ideas and concepts that were covered throughout this unit.

## Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Build	Left	Problem	Symmetry
Design	Make	Pyramid	Tool
Engineer	Measure	Right	Vehicle
Equivalent	Pattern	Solve	
Inventory	Persistence	Symmetrical	

## Recommended Children's Literature

The following books can be used to support the concepts presented throughout this unit.

**"What Do You Do With A Problem?"** by Kobi Yamada

**"Is it Symmetrical?"** by Nancy Allen

**"Seeing Symmetry"** by Loreen Leedy

**"What is Symmetry in Nature?"** by Bobbie Kalman



## Get Engaged!

Visit our community page at [kidsparkeducation.org/community](https://kidsparkeducation.org/community) for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.

## Unit Overview:

In this unit, students expand on their growing understanding of engineering and what it means to be an engineer. The activities engage them with a real-life problem that often faces engineers: how to make things strong. Students also learn part of the design cycle by testing their designs and improving them.

### Recommended Grade Level:

Pre-K - 1

### Kid Spark STEM Lab:

Foundational Fluencies

## Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the Common Core Standards in Math (CCS-MA).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Scientific and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young children.
- ⚙️ Common Core Standards in Math help teachers integrate ROK Block experiences with math curriculum and to help build a continuum of engineering learning from preschool to the primary grades.

Lessons	NGSS DCI	NGSS SEP	NGSS CCC	CCS-MA
<b>Lesson 1: How Much Load Can It Hold? (30-40 Min.)</b> In this lesson, students will learn what it means for something to be strong. Students will build a bridge and learn about the relationships between weight, strength, load, and reinforcement.	Engineering design	Developing & using models	Structure & function	Describe & compare measurable attributes
<b>Lesson 2: The Long Haul (30-40 Min.)</b> In this lesson, students will build a truck and explore different ways to make it stronger. Then, students will create their own truck and look for opportunities to strengthen it.	Engineering design	Asking questions & defining problems	Scale, proportion, & quantity	Analyze, create, & compose shapes
<b>Lesson 3: Make Your Castle Strong (30-40 Min.)</b> In this lesson, students will assemble a castle wall and explore different ways to make it stronger. Then, students will build a custom structure and look for opportunities to strengthen it.	Engineering design	Planning & carrying out investigations	Cause & effect; mechanism & explanation	Identify & describe shapes
<b>Lesson 4: Free Build (30-40 Min.)</b> In this lesson, students will apply what they have learned throughout this unit to create something new. Students will look for opportunities to improve the design as they build and test it.	Engineering design	Developing & using models	Scale, proportion, & quantity	Reason with shapes & their attributes.

## Unit Assessment: Making Things Strong

In this educator-led assessment, students will get hands-on with Kid Spark engineering materials as they demonstrate their understanding of the core ideas and concepts that were covered throughout this unit.



## Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Beam	Joint	Push	Vehicle
Bridge	Load	Reinforce	Work
Energy	Machine	Reinforcement	
Force	Pull	Strong(er) Test	

## Recommended Children's Literature

The following books can be used to support the concepts presented throughout this unit.

**"Building Bridges (Young Engineers)"** by Tammy Enz

**"Go! Go! Go! Stop!"** by Charise Mericle Harper



## Get Engaged!

Visit our community page at [kidsparkeducation.org/community](https://kidsparkeducation.org/community) for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.

## Unit Overview:

In this unit, students will learn about the physics of movement as they explore force, gravity, pushes and pulls, and more. Students will learn how to use Kid Spark engineering materials to create different types of movement in a design.

### Recommended Grade Level:

Pre-K - 1

### Kid Spark STEM Lab:

Foundational Fluencies

## Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the Common Core Standards in Math (CCS-MA).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Scientific and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young children.
- ⚙️ Common Core Standards in Math help teachers integrate ROK Block experiences with math curriculum and to help build a continuum of engineering learning from preschool to the primary grades.

Lessons	NGSS DCI	NGSS SEP	NGSS CCC	CCS-MA
<b>Lesson 1: Pushes &amp; Pulls (30-40 Min.)</b> In this lesson, students will build a tractor and explore how different forces, like pushes and pulls, can be used to move objects. Then, students will apply what they have learned to create something new.	Engineering design	Asking questions & defining problems	Cause & effect; mechanism & explanation	Identify & describe shapes
<b>Lesson 2: Exploring Gravity (30-40 Min.)</b> In this lesson, students will build a helicopter and explore the concept of gravity. Then, students will create a model aircraft of their own design.	Engineering design	Developing & Using models	Cause & effect; mechanism & explanation	Common Core
<b>Lesson 3: Make Your Castle Move (30-40 Min.)</b> In this lesson, students will build a castle wall and explore different ways to make a door open and close. Then, students will create a locking mechanism to secure the castle door.	Engineering design	Developing & Using models	Structure & function	Analyze, create, & compose shapes.
<b>Lesson 4: Free Build (30-40 Min.)</b> In this lesson, students will apply what they have learned throughout this unit to create something new. Students will look for opportunities to improve the design as they build and test it.	Engineering design	Planning & carrying out investigations	Scale, proportion, & quantity	Reason with shapes & their attributes.

## Unit Assessment: Making Things Move

In this educator-led assessment, students will get hands-on with Kid Spark engineering materials as they demonstrate their understanding of the core ideas and concepts that were covered throughout this unit.

## Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Curve	Gravity	Pull	Vehicle
Direction	Helicopter	Rotate	Wheel
Drag	Movement	Rotor	Work
Estimate	Pivot	Round	
Force	Push	Transport	

## Recommended Children's Literature

The following books can be used to support the concepts presented throughout this unit.

**"Motion: Push and Pull, Fast and Slow"** by Darlene Stille and Sheree Boyd

**"Pushes and Pulls"** by Helen Gregory

**"Push and Pull"** by Charlotte Guillain



## Get Engaged!

Visit our community page at [kidsparkeducation.org/community](https://kidsparkeducation.org/community) for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.