STEAM Park Teacher Guide

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STEAM Park
Teacher Guide Introduction

Who is the material for?
The STEAM Park Teacher Guide is for kindergarten teachers. It is designed to help teachers develop students' science, technology, engineering, art, and math (STEAM) skills, including understanding cause and effect relationships, making predictions and observations, problem-solving, and creating representations.

What is it for?
Throughout the lessons, students will explore the world around them as they use functional elements to build interactive models.

Using the Teacher Guide, kindergarten teachers can facilitate exciting lessons in which students learn to think like scientists as they build models, and experiment and test ideas to answer questions such as:

- Which items will sink? Which items will float?
- What will happen if I roll the car down the ramp?
- How can I make a chain reaction?

How are the learning objectives achieved?
Throughout the lessons, strategic questions will guide students through the process of applying science, technology, engineering, art, and math skills. Furthermore, the LEGO® DUPLO building activities will reinforce the students creativity.

The unit includes two Getting Started lessons designed to introduce the students to the basic ways they will be using the STEAM Park set. Introducing these activities first will give the students a solid foundation for completing the other six lessons. Subsequent lessons may be selected according to what is most relevant and appropriate for the students.

Printables
The lessons may contain three types of printables: templates, graphs, and inspiration photos showing lesson-related models. The inspiration photos can be used to help the students connect to the lesson, and may also be used as building inspiration when students are constructing their own models.

Customizing to Your Class Needs
The STEAM Park lessons can be tailored to your needs and the needs of your class. One STEAM Park set can be used with up to six students at a time, working in pairs. Students need a lot of practice before they become proficient at building with a partner, and this is a good way to promote collaboration. The activities can be done in centers or stations around the classroom, or in small groups.

Lesson Structure
Each lesson is structured according to a natural learning flow called the LEGO® Education 4C Approach, which promotes successful learning experiences. The Connect and Construct phases, which are the first two phases of each lesson, can be done in one 20-minute session. To ensure that young students are actively engaged, the Contemplate and Continue phases can be completed during a later session.

Connect
During the Connect phase, short stories and discussions will spark students curiosity and activate their existing knowledge while preparing them for a new learning experience.

Construct
In this phase, the students will participate in a hands-on building activity. As their hands create models of people, places, objects, and ideas, their minds will organize and store new information related to these structures.

Contemplate
During the Contemplate phase, students are given the opportunity to reflect on what they have done, and to talk about and share insights they have gained during theConstruct phase of the lesson.

Continue
New challenges in this phase build upon the concepts students learned previously in the lesson. These extension activities enable students to apply their newly-acquired knowledge.

Did you notice?
The lessons have been developed using the the Next Generation Science Standards, and the Common Core State Standards. They also support the science, math, and technology guidelines from the National Association for the Education of Young Children (NAEYC).

Please refer to the learning grid (p. 5) for an overview of these education guidelines. The Observation Checklist is listed at the end of each lesson can be used to determine whether or not each student is developing the relevant skills. These steps and bullet points target specific skills or pieces of information that are practiced or presented during each lesson.

STEAM Park Learning Grid

	CCSS.ELA-LITERACY.SL.K.5	CCSS.ELA-LITERACY.SL.K.4	NGSS K-2-ETS1-1	NGSS K-PS2-2	CCSS.MATH.CONTENT.K.CC.B.4	NGSS K-2-ETS1-3	CCSS.MATH.CONTENT.K.MD.A.1	CCSS.MATH.CONTENT.K.MD.B.3	CCSS.MATH.CONTENT.K.CC.C.6	CCSS.ELA-LITERACY.SL.K.6	CCSS.ELA-LITERACY.W.K.3	NGSS K-2-ETS1-1	CCSS.MATH.CONTENT.K.G.B.4	NGSS K-PS2-1	CCSS.MATH.CONTENT.K.G.A.1
Getting Started Functional Elements	●														
Getting Started Welcome to STEAM Park		●	●												
Ramps				●	●										
Moving on Water						●	●								
Probability								●	●						
Performing Arts										●	●				
Gears												●	●		
Chain Reaction														●	●

CCSS.MATH.CONTENT.K.MD.A.1.
Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

CCSS.MATH.CONTENT.K.G.A.1
Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.

CCSS.MATH.CONTENT.K.MD.B.3
Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

CCSS.MATH.CONTENT.K.G.B.4
Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

CCSS.MATH.CONTENT.K.CC.B.4
Understand the relationship between numbers and quantities; connect counting to cardinality.

CCSS.MATH.CONTENT.K.CC.C.6
Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

CCSS.ELA-LITERACY.W.K.3
Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.

CCSS.ELA-LITERACY.SL.K.4
Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.

CCSS.ELA-LITERACY.SL.K.5
Add drawings or other visual displays to descriptions as desired to provide additional detail.

CCSS.ELA-LITERACY.SL.K.6
Speak audibly and express thoughts, feelings, and ideas clearly.

NGSS K-2-ETS1-1.
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

NGSS K-2-ETS1-3.
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

NGSS K-PS2-1.
Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

NGSS K-PS2-2.
Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Help your kindergartners develop important skills

The Kindergarten solutions from LEGO® Education equip teachers to instantly engage their students in playful, hands-on, curriculum-relevant learning that encourages students to practice and apply essential skills and knowledge.

Students develop early STEAM, Literacy and Computer Science skills through standards-aligned lessons using familiar DUPLO® bricks.

A foundation for entry to the LEGO® Learning System, the Kindergarten solutions provide educational experiences that build students' confidence in learning as they begin school and prepare for the future.

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