



# LEGO® Education Coding Express

EXPLORE EARLY CODING CONCEPTS & 21ST CENTURY SKILLS

# Hands-on learning with LEGO® Education solutions

## Learning is hands-on and minds-on<sup>1</sup>

- Increases brain activation related to agency, decision-making, and flow<sup>2</sup>
- Enhances memory encoding and retrieval processes that support learning<sup>3</sup>
- Allows the brain to exercise networks responsible for executive control skills, such as pushing out distractions, which benefit short term and lifelong learning<sup>4</sup>

1. Learning through play: a review of the evidence, The LEGO Foundation, Jennifer M. Zosh, Emily J. Hopkins, Hanne Jensen, Claire Liu, Dave Neale, Kathy Hirsh-Pasek, S. Lynne Solis and David Whitebread, November 2017

2. Kuhn, Brass, & Haggard, 2012

3. Johnson, Singley, Peckham, Johnson, & Bunge, 2014

4. Diamond, 2013



Each hands-on solution incorporates our five characteristics of playful learning: joyful, actively engaging, socially interactive, iterative, and meaningful.

# Spark curiosity, collaboration and early coding skills with Coding Express

Young learners will explore early coding concepts such as sequencing, looping and conditional statement (the if-then) while developing important problem-solving, critical thinking, and social and emotional skills.

- Action bricks with different behaviors
- Getting-started activities
- Standards-aligned lessons
- Free optional app
- Engaging LEGO® DUPLO® bricks



**DESIGNED FOR YOUNG CHILDREN TO CREATE  
THEIR OWN JOURNEYS AND STORIES**



# Playful learning together

## Make stories come to life

- Early coding concepts as sequencing, looping and conditional statement
- Express ideas with digital elements
- Important 21st century skills
- Develop social, emotional and language skills

### EASY GETTING STARTED

Designed to make it easy to start exploring

### STUDENT ENGAGEMENT

Instant engagement and lifelong learning

### SKILLS DEVELOPMENT

Exploring early coding concepts and important 21st century skills



## Key learning values

- Sequencing
- Looping
- Conditional coding
- Expressing ideas with digital elements
- Language & literacy
- Collaboration
- Problem-solving
- Critical thinking



# Coding Express (ages 2-5) – a full teaching solution



# Hands-on #1

## In groups of 4-5 participants:

- Build a track and a train of your choice.
- Place the action bricks in the track, and explore how they work with the train.
- Build destinations alongside the track (look at the model cards in the teacher guide or building inspiration cards for inspiration).
- Create a story about what your train does during the trip.
- Present your story to the other participants.



## Learning Objectives

- Understand the action bricks
- Use action bricks to complete tasks
- Define the train's journey (sequencing)



# Recap

- What are your thoughts about the set so far?
- What did you discover when exploring the action bricks and the train?
- Looking at the evaluation criteria, how well does this activity support the expectations?
- Other reflections?



## Evaluation Criteria

- Identifying cause-and-effect relationships
- Observing and describing objects and events
- Correctly sequencing numbers or events
- Asking questions about concepts related to science and technology



# Teacher material

## Inspiring and easy-to-use teacher material

- Getting-started activities
- Teacher guide with 8 lessons
- Supporting teacher tutorial videos
- Introduction guide
- Building inspiration

## Professional development\*

\* Professional development is an add-on.

**Lesson Plans**

8 results | REMOVE FILTERS

**Grade**

- ☒ PreK-K (8)
- ☐ Grades 1-2 (0)
- ☐ Grades 3-5 (0)
- ☐ Grades 6-8 (0)

**Subjects**

- ☒ STEM (8)
- ☒ Math (8)
- ☒ Creative Exploration (8)
- ☒ Social Emotional Development (8)
- ☐ Engineering (0)
- + More subjects

**Duration**

- ☐ 0-30 min. (0)
- ☒ 30-45 min. (8)
- ☐ 45-90 min. (0)
- ☐ 90-120 min. (0)
- ☐ 120+ min. (0)

**Difficulty**

- ☐ Beginner (2)

**Coding Express Set**

**First Trip**

This getting started activity will allow the children to explore the action bricks and different bricks in the set.

STEM, Math, Creative Exploration, Social Emotional Development

PreK-K 30-45 min. Beginner

**Coding Express Set**

**Train Sound**

In this lesson children will understand the function of each action bricks and how to use them to solve problems.

STEM, Math, Creative Exploration, Social Emotional Development

PreK-K 30-45 min. Beginner

**Coding Express Set**

**O-Shaped Track - Looping**

The objective of this lesson is for children to explore and understand use of the O-shaped track for repeating sequences.

STEM, Math, Creative Exploration, Social Emotional Development

PreK-K 30-45 min. Intermed.

# Teacher guide

Interactive pdf and e-pub with video content

Short video tutorial for each lesson

Learning grids, specific to Coding Express lessons

8 lessons in 3 categories:

- 2 beginner, 4 intermediate, and 2 advanced
- 4 lessons without the app, 4 with the app

Appendix with printable model cards

Download it from

[www.legoeducation.com/downloads](http://www.legoeducation.com/downloads)

## TABLE OF CONTENTS



Click the home icon on pages to get back to Table Of Contents

### LESSONS

<a href="#">Teacher Guide Introduction</a> .....	3	<a href="#">Beginner – First Trip</a> .....	9
<a href="#">Learning Grid</a> .....	7	Exploring the red and green action bricks	
<a href="#">Appendix</a> .....	26	<a href="#">Beginner – Train Sound</a> .....	11
		Exploring sequencing and the blue, yellow, and white action bricks	
		<a href="#">Intermediate – O-Shaped Track</a> .....	13
		Exploring loops with the O-shaped track	
		<a href="#">Intermediate – Y-Shaped Track</a> .....	15
		Exploring conditional statements with the Y-shaped track	
		<a href="#">Intermediate – Character – Caterpillar (App)</a> .....	17
		Exploring storytelling and social emotional development	
		<a href="#">Intermediate – Music – Animal Concert (App)</a> .....	20
		Using digital tools to design and express ideas	
		<a href="#">Advanced – Journey – Troubles on the Road (App)</a> ..	20
		Practicing problem-solving	
		<a href="#">Advanced – Math – Distance (App)</a> .....	22
		Making predictions and measuring distances	

# Learning grid

Developed based on the science, math, and technology guidelines from NAEYC and Head Start.

The learning goals are listed at the end of each lesson under “EVALUATE” to help you determine whether the children are developing the relevant skills.

<div> <div>CODING EXPRESS</div> <div>LEARNING</div> <div>GRID</div> </div> (NAEYC and Head Start)		LESSONS							
		First Trip	Train sound	O Shaped Track	Y Shaped Track	Character	Music	Journey	Math
		Beginner	Intermediate				Advanced		
MATH	Counting using number names, and begin recognizing the number of objects in a set								●
	Sequencing numbers or events		●		●	●	●		●
	Exploring measurement and begin using standard and nonstandard forms of measurement								●
SCIENCE & TECHNOLOGY	Asking questions about technology related concepts	●	●	●					
	Identifying cause and effect relationships	●	●	●	●	●	●	●	●
	Making predictions						●	●	●
	Using strategies and planning in order to solve problems							●	●
	Designing and expressing ideas with digital/technology tools				●	●	●	●	●
LANGUAGE & LITERACY SOCIAL & EMOTIONAL DEVELOPMENT	Expressing thoughts, ideas, and opinions to others				●	●	●		
	Observing and describing	●	●	●					
	Recognizing and naming emotions					●			
	Understanding other people's feelings					●			
	Expressing their thoughts and feelings					●			
	Understanding how one's actions can affect others					●			

# 21st century skills

Developed based on the 21st century skills early learning framework, targeting cross-curricular skills.

Read more on the 21st century skills website  
[www.P21.org](http://www.P21.org).

<div> <div>21<sup>ST</sup> CENTURY SKILLS (P21)</div> <div>EARLY LEARNING</div> <div> <span>●</span> – fully covered  <span>◐</span> – partially covered         </div> </div>	LESSONS							
	First Trip	Train Sound	O-Shaped Track	Y-Shaped Track	Character	Music	Journey	Math
	Beginner	Intermediate				Advanced		
Creativity and innovation	●	●	●	●	●	●	●	◐
Critical thinking and problem-solving	◐	◐	●	●	●	◐	●	●
Communication	●	●	●	●	●	●	●	●
Collaboration	●	●	●	●	●	●	●	◐
Flexibility and adaptability	◐	◐	●	●	●	●	●	●
Initiative and self-direction	●	●	●	●	●	●	●	●
Social and cross-cultural	◐	◐	●	●	●	●	●	◐
Productivity and accountability	◐	◐	●	●	●	●	●	●
Leadership and responsibility	◐	◐	●	●	●	●	●	●
Information and media literacy	◐	◐	◐	◐	●	●	●	●



“I have never seen anything like Coding Express, and I am very intrigued with its structure and the varying ways it can teach children specific skills they might not have gained through play before.

I love its versatility and how the many different areas of play will keep most children occupied for a very long time.”

Kate Leis  
Early Learning Educator  
Primrose School of Burlington  
Massachusetts



# Coding concepts – hands-on #2

## What is sequencing?

Actions arranged in a particular order.

## What is looping?

A sequence of actions that is continually repeated.

## What is conditional coding?

If a certain condition is met, a specific action is applied.

**All concepts support logical and analytical thinking and problem-solving.**



## Hands-on activity

Revisit your beginner activity models, and apply loops and/or conditions to your trains journey.

*Tip: Work with O-shaped for loops or Y-shaped tracks for conditions. Add new destinations to the journey.*



# Recap

- What did you discover when exploring the coding concepts?
- Looking at the evaluation criteria, how well does this activity support the expectations?
- Other reflections?



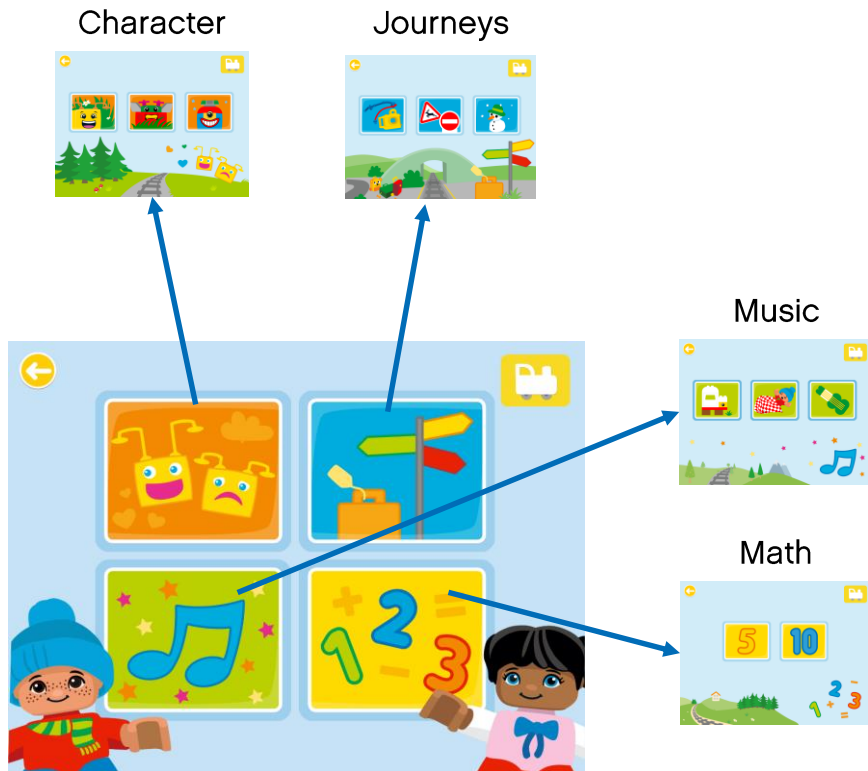
## Evaluation Criteria

- Observing and describing objects and events
- Asking questions about concepts related to science and technology
- Identifying cause-and-effect relationships

# Free optional app

The app provides four themes to explore.  
The app alters the behavior of the action bricks.

**Requirements: iOS and Android**





# Hands-on: “caterpillar”

“There was a caterpillar who loved all kinds of colors and she always dressed in lots of colors. She went to preschool, just like all of you! Her favorite thing to do at preschool was to play hide-and-seek, and she loved to eat snacks with her friends.

But sometimes, she got upset because she was very tired after playing for a long time. The best way to make her happy again was to let her nap for a little while. In the winter, sometimes the caterpillar got sick. Her teacher always took good care of her, wiping her nose and giving her water to drink.”

## Hands-on activity:

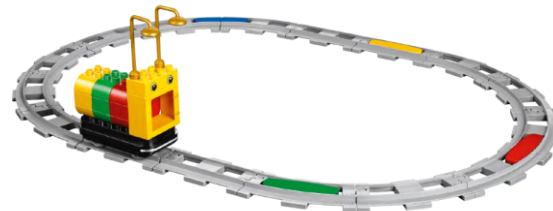
- Build an O-shaped track and the caterpillar (see the teacher guide for more information).
- Connect the caterpillar to the app.
- Place one action brick of each color on the track.
- What happens after the caterpillar passes each action brick?

## Extension

- Can you create/build something to make the caterpillar feel happy or cheerful?
- Present your solutions.

## Learning Objectives

- Understand that the action bricks' behavior can be changed using the app
- Recognize and understand different emotions
- Be able to use the app and the sequence of the action bricks to create stories



# Recap

- What are your thoughts on this activity?
- Looking at the evaluation criteria, how well did this activity support the expectations?
- How could this activity be differentiated?
- Other reflections?

## More ideas

See the ***Troll*** and ***Robot*** activities in the app and create your own stories for the characters.



## Evaluation Criteria

- Expressing thoughts, ideas, and opinions to others
- Designing and expressing ideas using digital tools and technology
- Understanding the concept of looping and sequencing
- Identifying cause-and-effect relationships
- Understanding other people's feelings
- Expressing their thoughts and feelings
- Recognizing and naming emotions
- Understanding how their actions affect others

# A part of the LEGO® Education continuum of learning

## EARLY LEARNING



Coding  
Express



STEAM  
Park

and many more



PRIMARY

WeDo 2.0  
Early Simple Machines  
Simple Machines



SECONDARY

LEGO® MINDSTORMS®  
Education EV3  
Simple & Powered  
Machines



# Thank you!



# Backup slides