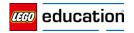
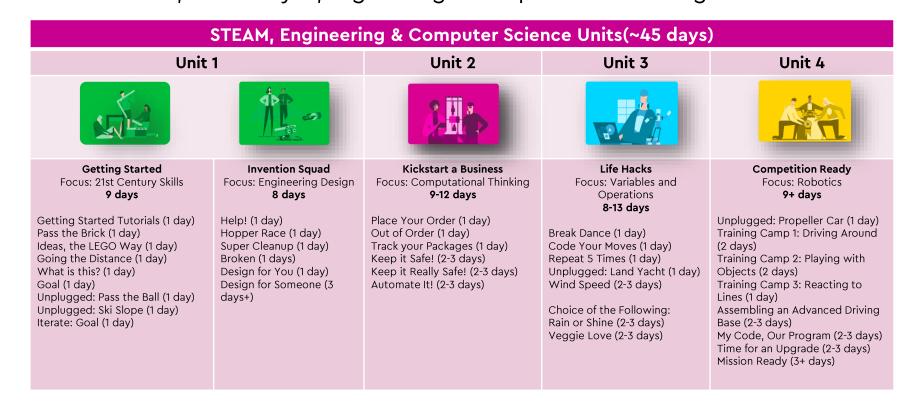


Middle School STEAM **Standards and Lesson Alignments**



LEGO® Education SPIKETM Prime STEAM Sequence Focus: Science, Data Analysis, Engineering & Computational Thinking





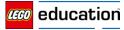
Unit 1 Overview

Getting Started with SPIKE Prime Focus: Getting Started and 21 st Century Skills 6-7 Days				
		Getting Started		
Day 1 30-45 min	Getting Started Tutorial Lessons	7-8.NSD.2 Design a project that combines hardware and software components.		
	Supplementary Lessons			
Day 2 30-45 min	<u>Lesson 1: Pass the</u> <u>Brick</u>	7-8.NSD.2 Design a project that combines hardware and software components.		
Day 3 30-45 min	<u>Lesson 2: Ideas, the</u> <u>LEGO Way!</u>	7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.		
Day 4 30-45 min	<u>Lesson 3: What is</u> <u>this?</u>	7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.		
Day 5 30-45 min	Lesson 4: Going the Distance	9-12.CT.9 Systematically test and refine programs using a range of test cases, based on anticipating common errors and user behavior.		
Day 6 30-45 min	<u>Lesson 5: Goal</u>	 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product. 9-12.CT.10 Collaboratively design and develop a program or computational artifact for a specific audience and create documentation outlining implementation features to inform collaborators and users 		



Unit 1 Overview

<u>Invention Squad</u> Focus: Engineering Design 9 Days		
Day 1 30-45 min	<u>Help!</u>	 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information. 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem.
Day 2 30-45 min	Hopper Race	7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.
Day 3 30-45 min	<u>Super Cleanup</u>	7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.
Days 4-5 45-90 min	<u>Broken</u>	7-8.NSD.3 Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide 7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
Day 6 45 min	<u>Design for You</u>	7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.
Days 7-9 120+ min	<u>Design for</u> <u>Someone</u>	 7-8.NSD.3 Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide. 7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.

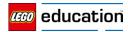


Unit 2 Overview

Kickstart a Business Focus: Computational Thinking and Automation 15 Days		
Days 7-9 90-120 min	<u>Keep it Safe</u>	7-8.NSD.3 Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide 7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
Days 10- 12 90-120 min	<u>Keep it Really</u> <u>Safe!</u>	 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem. 7-8.CT.4 Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task. 7-8.CY.2 Describe physical, digital, and behavioral safeguards that can be employed in different situations.
Days 13-15 120+ min	<u>Automate it!</u>	 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information. 7-8.CT.4 Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.

Unit 2 Overview

Kickstart a Business Focus: Computational Thinking and Automation 15 Days		
Day 1 15 min	<u>Back to Back</u>	7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
Day 2 30-45 min	<u>Place Your</u> <u>Order</u>	 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem. 7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program. 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information.
Day 3 30-45 min	<u>Out of Order</u>	7-8.NSD.3 Identify and fix problems with computing devices and their components using a systematic troubleshooting method or guide
Days 4-6 90-120 min	<u>Track Your</u> <u>Packages</u>	 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem. 7-8.CT.4 Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.



Unit 3 Overview

<u>Life Hacks</u> Focus: Computational Thinking and Automation 12 Days			
Day 1 30-45 min	<u>Break Dance</u>	7-8.CT.3 Refine and visualize a data set in order to persuade an audience.	
Day 2 30-45 min	<u>Code Your</u> <u>Moves</u>	7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.	
Day 3 30-45 min	<u>Repeat 5 Times</u>	7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information.	
Student Choice or Optional Lessons			
Days 4-6	<u>Rain or Shine</u>	7-8.CT.2 Collect and use digital data in a computational artifact	
Each lesson takes 90-120	Wind Speed	7-8.CT.2 Collect and use digital data in a computational artifact	
min	<u>Veggie Love</u>	7-8.CT.2 Collect and use digital data in a computational artifact 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information.	
Days 7-9 120+ min	<u>Brain Game</u>	7-8.CT.3 Refine and visualize a data set in order to persuade an audience. 9-12.CT.7 Design or remix a program that utilizes a data structure to maintain changes to related pieces of data.	
Days 10-12 120+ min	<u>The Coach</u>	 7-8.IC.1 Compare and contrast tradeoffs associated with computing technologies that affect individuals and society. 7-8.NSD.2 Design a project that combines hardware and software components. NYS MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem 	





Unit Overview

<u>Training Trackers</u> Focus: Energy 10 days			
Day 1	30-45 min	Lesson 1: Stretch with Data	4-6.CT.1 Develop a computational model of a system that shows changes in output when there are changes to input. 7-8.NSD.2: Design a project that combines hardware and software components.
Day 2	30-45 min	<u>Lesson 2: This is Uphill</u>	4-6.CT.1 Develop a computational model of a system that shows changes in output when there are changes in inputs. 7-8.NSD.2: Design a project that combines hardware and software components.
Day 3	30-45 min	<u>Lesson 3: Time for Squat Jumps</u>	4-6.CT.2 Collect digital data related to a real-life question or need. 7-8.CT.3 Refine and visualize a data set in order to persuade an audience.
Days 4-5	45-90 min	Lesson 4: Watch Your Steps	4-6.CT.2 Collect digital data related to a real-life question or need. 7-8.CT.3 Refine and visualize a data set in order to persuade an audience.
Days 6-7 Advanced	45-90 min	<u>Lesson 5: Aim for It</u>	 4-6. NSD.2: Model how computer hardware and software work together as a system to accomplish tasks. 7-8.NSD.2: Design a project that combines hardware and software components.
Days 8-10	120+ min	Lesson 6: The Obstacle Course	4-6. NSD.2: Model how computer hardware and software work together as a system to accomplish tasks.7-8.NSD.2: Design a project that combines hardware and software components.

Unit 4 Overview

Competition Ready Focus: Robotics 5-7 Days			
Day 1 30-45 min	<u>Training Camp 1:</u> <u>Driving Around</u>	7-8.NSD.2 Design a project that combines hardware and software components.	
Day 2 30-45 min	Training Camp 2: Playing with Objects	 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information. 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem. 	
Day 3 30-45 min	<u>Training Camp 3:</u> <u>Reacting to Lines</u>	 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information. 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem. 7-8.CT.5 Identify multiple similar concrete computations in a program, then create a function to generalize over them using parameters to accommodate their differences. 	



Unit 4 Overview

Competition Ready Focus: Robotics 9-15 Days		
Days 4-6 90-120 min	<u>Assembling an</u> <u>Advanced Driving</u> <u>Base</u>	 7-8.NSD.2 Design a project that combines hardware and software components. NYS MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. NYS MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Days 7-9 90-120 min	<u>My Code, Our</u> <u>Program</u>	 7-8.CT.5 Identify multiple similar concrete computations in a program, then create a function to generalize over them using parameters to accommodate their differences. 7-8.CT.8 Develop or remix a program that effectively combines one or more control structures for creative expression or to solve a problem.
Days 10- 12 90-120 min	<u>Time for an</u> <u>Upgrade</u>	7-8.NSD.2 Design a project that combines hardware and software components. 9-12.CT.9 Systematically test and refine programs using a range of test cases, based on anticipating common errors and user behavior
Days 13- 15 120+ min	<u>Mission Ready</u>	 7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information. 7-8.CT.5 Identify multiple similar concrete computations in a program, then create a function to generalize over them using parameters to accommodate their differences. 7-8.CT.10 Document the iterative design process of developing a computational artifact that incorporates user feedback and preferences.

