Middle School STEAM

Standards and Lesson Alignments

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

STEAM, Engineering & Computer Science Units(~45 days)				
Unit 1		**Unit 2**	**Unit 3**	**Unit 4**
Getting Started Focus: 21st Century Skills **9 days**	**Invention Squad** Focus: Engineering Design **8 days**	**Kickstart a Business** Focus: Computational Thinking **9-12 days**	**Life Hacks** Focus: Variables and Operations **8-13 days**	**Competition Ready** Focus: Robotics **9+ days**
Getting Started Tutorials (1 day) Pass the Brick (1 day) Ideas, the LEGO Way (1 day) Going the Distance (1 day) What is this? (1 day) Goal (1 day) Unplugged: Pass the Ball (1 day) Unplugged: Ski Slope (1 day) Iterate: Goal (1 day)	Help! (1 day) Hopper Race (1 day) Super Cleanup (1 day) Broken (1 days) Design for You (1 day) Design for Someone (3 days+)	Place Your Order (1 day) Out of Order (1 day) Track your Packages (1 day) Keep it Safe! (2-3 days) Keep it Really Safe! (2-3 days) Automate It! (2-3 days)	Break Dance (1 day) Code Your Moves (1 day) Repeat 5 Times (1 day) Unplugged: Land Yacht (1 day) Wind Speed (2-3 days) Choice of the Following: Rain or Shine (2-3 days) Veggie Love (2-3 days)	Unplugged: Propeller Car (1 day) Training Camp 1: Driving Around (2 days) Training Camp 2: Playing with Objects (2 days) Training Camp 3: Reacting to Lines (1 day) Assembling an Advanced Driving Base (2-3 days) My Code, Our Program (2-3 days) Time for an Upgrade (2-3 days) Mission Ready (3+ days)

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Unit 1 Overview

Getting Started with SPIKE Prime Focus: Getting Started and 21st 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	Lesson 1: Pass the Brick	7-8.NSD.2 Design a project that combines hardware and software components.
Day 3 30-45 min	Lesson 2: Ideas, the LEGO Way!	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	Lesson 3: What is this?	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	Lesson 5: Goal	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

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Unit 1 Overview

Invention Squad Focus: Engineering Design 9 Days		
Day 1 30-45 min	Help!	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	Super Cleanup	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	Broken	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	Design for You	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	Design for Someone	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.

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Unit 2 Overview

Kickstart a Business Focus: Computational Thinking and Automation 15 Days		
Days 7-9 90-120 min	Keep it Safe	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	Keep it Really Safe!	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	Automate it!	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.

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Unit 2 Overview

	Kickstart a Business Focus: Computational Thinking and Automation 15 Days	
Day 1 15 min	Back to Back	7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
Day 2 30-45 min	Place Your Order	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	Out of Order	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	Track Your Packages	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.

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Unit 3 Overview

Life Hacks Focus: Computational Thinking and Automation 12 Days		
Day 1 30-45 min	Break Dance	7-8.CT.3 Refine and visualize a data set in order to persuade an audience.
Day 2 30-45 min	Code Your Moves	7-8.CT.6 Design, compare and refine algorithms for a specific task or within a program.
Day 3 30-45 min	Repeat 5 Times	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 *Each lesson takes 90-120 min*	*Rain or Shine*	7-8.CT.2 Collect and use digital data in a computational artifact
	Wind Speed	7-8.CT.2 Collect and use digital data in a computational artifact
	Veggie Love	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	Brain Game	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	The Coach	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

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Unit Overview

		Training Trackers 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	[Lesson 2: This is Uphill](#)	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	[Lesson 3: Time for Squat Jumps](#)	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	[Lesson 5: Aim for It](#)	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.

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Unit 4 Overview

		Competition Ready Focus: Robotics 5-7 Days
Day 1 30-45 min	Training Camp 1: Driving Around	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	Training Camp 3: Reacting to Lines	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.

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Unit 4 Overview

	Competition Ready Focus: Robotics 9-15 Days	
Days 4-6 90-120 min	Assembling an Advanced Driving Base	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	My Code, Our Program	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	Time for an Upgrade	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	Mission Ready	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.

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