Continuing for Coding (and Engineering) In Pre-K/3 through 12th grade

Developed by Elizabeth "Betsy" Minton

Grade Level	Robot, Program, or Materials	Concepts Taught
Pre-K/3	• Dot and Dash • LEGO DUPLO creative builders set	• Remote control of robots to encourage interest • Following directions with LEGO • Introduction to engineering and problem solving with LEGO
Pre-K/4	• Dash- path programming • LEGO DUPLO early structures set	• Draw to program so that they begin to understand that robots follow commands • Introduction to engineering and problem solving LEGO
Kindergarten	• BeeBot • Dash- path programming • LEGO DUPLO early simple machines	• Sequential programming (forward, turn, backwards) in block play • BeeBot on a number line to count, add, and subtract • Continue to explore path programming • Develop perspective by learning that forward (or up) is different depending on which way it is facing • Introduction to more complex building with LEGO using both DUPLO and LEGO
1st grade	• LEGO creative bucket • LEGO Learn to Learn • BeeBot • Cubelets • Scratch Jr	• Using LEGO to solve challenges and introduce students to a simplified design process • Improve sequential programming to solve increasingly complex problems • Experimenting with building robots by combining LEGO with Cubelets • Using simple programming languages to tell a story (what is a sprite, background, using paint, introducing loops and events

2nd grade	• LEGO creative bucket • Cubelets • Code.org course 1 - introduced as an option on their classroom computers and iPads • Scratch Jr • Dot and Dash (Blockly)	• Review sequential programming • Introduce colored "think" Cubelets laying the groundwork for conditional statements • Develop more complex engineering skills by building Cubelet robots with LEGO • Produce complex stories using Scratch Jr including multiple scenes
3rd grade	• LEGO Technics • Hour of code (Tynker this year) • Code.org course 1 - introduced as an option on their classroom computers and iPads • Dot and Dash (Blockly)	• Introduction to LEGO technics, building increasingly complex structures including gears and axles • Use Dash and Blockly during measurement unit to solve mazes • Explore Blocky to drive in shapes and reinforce the concept of loops
4th grade	• Code.org course 2 • Cubelets • LEGO simple and mechanized Machines	Taught during science • Review of sequential programming, more complex work includes loops and conditional statements • Using the sensors with Cubelets during senses unit to design robot "creatures" that interact with their environment further developing understanding of conditional statements • Continue to develop LEGO building and engineering skills and motors to LEGO creations
5th grade	• Assess retention of Code.org course 2 and either complete course 2 or begin course 3 • BeeBots • Cubelets • Scratch (WeDo 1.0, MakeyMakey) • Dash and Dot • LEGO MindStorms	Robotics Enrichment Class (9 weeks) • Making the connection between coding and robotics • Relating sensors to conditionals and using them to solve increasing complex problems • Generalizing that knowledge to other coding programs such as Scratch, Hopscotch, and Tickle • Use Dash to help develop the concepts of variable and functions • Develop technic LEGO skills to build working attachments for the

		MindStorms robot
Middle School	• Robotics club (includes FIRST LEGO League) • Middle School MakerSpace with all of the robots used in the elementary school • LEGO MindStorms	• Integrated Science does a robotics unit as part of their class They learn to program in MindStorms using sequential programming, loops, and switches • The physical science class uses MindStorms to study velocity • Independent study in coding languages using Code.org, App Inventor, and Swift Playgrounds to name a few
High School	• Robotics club (participates if FIRST Robotics Competition • Engineering Class • AP Computer Science	Too many to list