



STEM Education Works®

## Scope & Sequence

### Coding with Build Smart Clubhouse



## BUILD SMART CLUBHOUSE

	Grade Band	Unit	Overview
BUILD SMART CLUBHOUSE	6-8	Introduction to Smart Homes	Students define smart homes and systems as they work together to brainstorm various smart systems within their homes and in the world around them. Using provided kits, students explore the variety of sensors available to them. They consider how to apply their knowledge of these systems as they begin to design their automated clubhouses.
	6-8	Blueprint Basics	Students incorporate foundational knowledge of blueprint basics as they design their model clubhouses. They identify the scale and dimensions needed throughout the project and create the floor plans with both scaled and true size dimensions. Students use their acquired scaling knowledge to create the floor plans and elevation drawings of their models.
	6-8	Building Framework (Base)	Students explore several construction terms and a variety of wood members that create a building framework. Students learn foundational knowledge and proper techniques needed to frame a structure.
	6-8	Blueprint Basics (Walls)	Students design the framework of their clubhouses. They practice converting measurements to solve scale problems. Then, they incorporate their knowledge of structural members to plan the walls of their clubhouses. Students continue to learn how engineers use scale in their designs of structures, products, and systems.
	6-8	Constructing the Base	Using conventional wall framing techniques, students incorporate foundational construction concepts as they begin to build their clubhouses' frames. Students continue to relate their work to engineering and technical concepts as they practice scaling their models. They connect the model dimensions and true size dimensions of all of the wood framing components within their base framework.
	6-8	Side Walls	Students build their side walls using four-stud corner framing techniques. They continue to practice scaling as they work on their models.
	6-8	Front Wall	Students continue to incorporate construction concepts as they build their front walls. Students learn that framing a door opening requires knowledge of building codes to withstand the weight load. Students also continue to scale dimensions of their model as they identify the scaled and true size dimensions of all of the wood framing members.



NGSS Standards Alignment	NGSS Discipline	Connected Subjects	Time Required
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2.5 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2 hours



	Grade Band	Unit	Overview
BUILD SMART CLUBHOUSE	6-8	Rear Wall	Students continue to use construction concepts to build their rear walls. They learn that framing a window opening, like a door opening, requires building codes to withstand the weight load. Students continue to scale their model dimensions as they identify the scaled and true size dimensions of all of the wood framing members within their clubhouses' rear walls.
	6-8	Completing the Framework	Students work to complete the framework of their clubhouses. They combine the four walls and bases they built to turn their 2D designs into 3D models. Students learn about prefabricated construction designs, such as homes with prefabricated wall panels. They continue to incorporate their knowledge of wall framing techniques as they assemble their models in a similar manner to builders who use prefabricated wall panels. After this lesson, students will have their framework completed.
	6-8	Computational Thinking	Students explore computational thinking, including skills (decomposition, pattern recognition, abstraction, algorithm, and evaluation) and approaches (tinkering, creating, debugging, persevering, and collaborating). Students learn we can decompose large problems into smaller, simpler tasks. Students provide a "robot" with instructions. This activity guides students toward discovering that small details of their algorithms are essential.
	6-8	Circuits	In this lesson, students are introduced to several key concepts of electronic circuits. Through hands-on activities, students become familiar with the physical components they will use throughout the unit to automate their homes. They gain knowledge of the basics of circuits as they turn on LEDs. Students apply their knowledge to construct and illustrate simple circuits, including electrons' flow, as they turn on fans and LEDs using wires, batteries, and switches.
	6-8	Block Coding	Students use the micro:bit to program their clubhouses. Students learn block programming as they complete various tasks using their knowledge of blocks and conditional statements.
	6-8	Customizing a Doorbell	Students learn how to create a program with block-based coding. They critically review code to identify the block, pin placement, and components required to build and set up a customized doorbell.
	6-8	Lights	Students create working LED lights for their clubhouses. By using light sensors and LEDs, they can program micro:bits to turn on lights inside the clubhouses automatically. Students continue to build upon their skills to incorporate if/then/else statements and variables within their code.



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MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-2 MS-ETS1-3	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2 hours
MS-ETS1-1 MS-ETS1-2	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2 hours
MS-ETS1-1 MS-ETS1-2	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours
MS-ETS1-1 MS-ETS1-2	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	1.5 hours



	Grade Band	Unit	Overview
BUILD SMART CLUBHOUSE	6-8	Fan	Students learn that by using temperature sensors and fans, they can program micro:bit to turn on the fans once the clubhouses' environments reach a specific temperature.
	6-8	Thermostat	Students create working thermostats for their clubhouses using the OLED components. Using the micro:bit, the fan component is automated to turn on once the clubhouse's environment reaches a specific temperature.
	6-8	Nesting and Flowcharts	Students learn about nesting within the context of programming. They automate their clubhouses by creating a nested program. After the lesson, students should have fully automated clubhouses, complete with working doorbells, LEDs, fans, and thermostats.
	6-8	Finishes	Students complete their clubhouse models. They learn about some of the design decisions builders make about interior and exterior finishes. Students apply their knowledge of finishes to make the final design decisions for their clubhouses as they add siding, paint, fixtures, and personal touches to create unique structures.





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MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	2 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	4 hours
MS-ETS1-1 MS-ETS1-2 MS-ETS1-4	Engineering, technology, and applications of science	ELA, science, math, social studies, art, SEL, movement	3 hours



