Middle School (6-8) Scope & Sequence

The middle school scope and sequence provides a recommended sequence of SmartLab HQ projects for sixth through eighth grade learners.

Purpose of the SOT Articulation Code: The SOT Articulation Code indicates the order in which each activity should be completed within a System of Technology (SOT). The complexity of the tool, concepts addressed, and developmental appropriateness for the learner is considered to determine the order.

Note: This does not indicate the overall order of all project starters for a specific grade band. See the table below for the grade level sequence.

Understanding the SOT Articulation Code: The SOT Articulation Code is made of five parts.

System of technology

Software Engineering System of Technology

Resource acronym

MakeCode Arcade

SL2 . SE . 3 . MC . 1

Course Recommendation

Recommended for SmartLab 2

Order in which kit or software appears

First Mechanics and Structures resource to use

Order in which project starter should be completed

First project starter to complete out of the set available for Geometric Shapes

SmartLab 1 Overview

The overview below can help you plan the rotations for your SmartLab 1 classes in the SmartLab HQ.

SmartLab 1 courses are intended for students who have little to no experience with the SmartLab tools and format. This could mean enrolling all 6th grade students for a semester-long SmartLab 1 course or offering SmartLab 1 as a mixed-grade elective course as scheduling constraints permit.

The set of tools in this suggested scope and sequence provides learners with a survey of the Systems of Technology and allows them to develop the skills for self-directed project-based learning in future SmartLab courses.

Additional challenge details and targeted standards information can be found in the complete Middle School Project Starters list.

Suggested Scope and Sequence

Resource	SOT Code	Project Starter
Engino (Kit)	SL1.MS.2.E.1	Building Bridges (L1)
Vectr (Website)	SL1.CG.1.V.1	Create Custom Logos (L1)
Frames (PC Software)	SL1.DC.1.F.1	Introduction to Stop Motion Animation (L1)
Stop Motion Studio Pro 2 (Mac Software)	SL1.DC.1.SMSP.1	Introduction to Stop Motion Pro (L1)
Alternative Energy (Website)	SL1-2.S.1.AE.1	Introduction to Alternative Energy (L1)
Snap Circuits (Kit)	SL1-2.C.1.SC.1	Getting Started with Electricity (L1)
Extreme Weather (Website)	SL1.SDA.1.EW.1	Weather, Climate, and Monster Storms (L1)
Scratch v3 (Software)	SL1-2.SE.2.S.1	Programming an Animation (L1)
ArcKit (Kit)	SL1-2.MS.3.A.1	Build Your Own House (L1)
Comic Life (Software)	SL1.DC.2.CL.1	Historical Stories (L1)
Stellarium (Software)	SL1.SDA.2.STEL.1	Exploring the Celestial Sphere (L1)
Tinkercad (Website)	SL1-2.CG.2.T.1	Drawing 3D Objects (L1)
MakeCode Arcade (Website)	SL1-2.SE.3.MC.1	Getting Started with MakeCode Arcade (L1)
fischertechnik Green Energy (Kit)	SL1-2.S.2.FTGE.1	Alternative Energy (L1)
Tinkercad Circuits (Website)	SL1.C.2.TC.1	Getting Started with Tinkercad Circuits (L1)
VEX IQ (Kit/Software)	SL1-2.RCT.2.VEXIQ.1	Basic Self Driving Car (L1)
GarageBand (App/Software)	SL1.DC.3.GB.1	Create Your Own Ringtones (L1)
fischertechnik Mechanics 2.0 (Kit)	SL1-2.MS.4.FTM.1	Machines and Gears (L1)
Vernier Secondary Sensing Science (Kit/Software)	SL1-2.SDA.5.VSSS.1	Measuring Temperature (L1)

SmartLab 2 Overview

The overview below can help you plan the rotations for your SmartLab 2 classes in the SmartLab HQ.

SmartLab 2 courses are intended for students who have at least one semester of experience with the SmartLab tools and format. This course could serve as a 7th grade course or a mixed-grade elective course for students who have taken SmartLab 1 depending on the scheduling at your school.

We encourage you to allow students to choose more advanced project starters and engage in projects that they create as they gain experience with the tools and project format in the SmartLab HQ.

Additional challenge details and targeted standards information can be found in the complete Middle School Project Starters list.

Suggested Scope and Sequence

Resource	SOT Code	Project Starter
Alternative Energy (Website)	SL1-2.S.1.AE.1	Introduction to Alternative Energy (L1)
ArcKit (Kit)	SL1-2.MS.3.A.2	Modernizing a Classic (L2)
Snap Circuits (Kit)	SL1-2.C.1.SC.2	2-Way Switch Circuits (L2)
Scratch v3 (Software)	SL1-2.SE.2.S.2	Animated Greeting Cards (L2)
Tinkercad (Website)	SL1-2.CG.2.T.2	Prototyping (L2)
VEX IQ (Kit/Software)	SL1-2.RCT.2.VEXIQ.2	The Basics (L1)
Google Earth (Software)	SL2.SDA.3.GGE.1	Mapping Your World (L1)
Audio Engineering iPad (App)	SL2.DC.5.AEI.1	Introduction to Music Production (L1)
micro:bit (Kit/Website)	SL2.C.3.MB.1	Emoji (L1)
Google Sites (Website)	SL2.DC.6.GGS.1	My First Website (L1)
MakeCode Arcade (Website)	SL1-2.SE.3.MC.2	Designing Themed Games (L2)
fischertechnik Mechanics 2.0 (Kit)	SL1-2.MS.4.FTM.2	The World of Statics (L1)
Photoshop Elements (Software)	SL2.CG.3.PSE.1	Editing Photos (L1)
fischertechnik Green Energy (Kit)	SL1-2.S.2.FTGE.2	Hydrogen Fuel Cell Car (L2)
RoboMaster S1 (Kit/Software)	SL2.RCT.3.PE.1	Search and Rescue with Scratch Programming (L1)
Bridge Designer (Software)	SL2.MS.5.BD.1	Exploring Virtual Bridge Design (L1)
Premiere Elements (Software)	SL2.DC.7.PE.1	Recreate Your Favorite Movie Scene (L2)
Vernier Secondary Sensing Science (Kit/Software)	SL1-2.SDA.5.VSSS.3	A Distant Light (L1)

Middle School Project Starters

This list includes the project starters written for the core set of technologies in the Middle School Layer.

The list is organized by System of Technology. Within each System of Technology, the project starters are sorted in by resource or tool type and then the order in which the project starter should be completed for that technology.

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Snap Circuits (Kit)	SLI-II.C.1.SC.1	Getting Started with Electricity (L1)	Your challenge is to learn the basics of circuitry by building and testing circuits of your own.	I CAN describe insulators and conductors. I CAN build a basic circuit to test conductivity. I CAN summarize a set of data by documenting the conductivity of a basic circuit I built and documenting effectiveness in a table.	CCSS.MATH.CONTENT.6.SP.B.5, CCSS.MATH.CONTENT.6.SP.B.5.A, NGSS.MS-ETS1-3	Distributions, Engineering
Snap Circuits (Kit)	SLI-II.C.1.SC.2	2-Way Switch Circuits (L2)	Your challenge is to learn how to rewire a light for a stairway so that it can be controlled from two switches: one at the top of the stairs and one at the bottom of the stairs.	I CAN describe how electrical switches are used to provide electricity. I CAN design and build an electrical circuit to control lights in a home. I CAN use 3-way switches to design a two-way light switching circuit for a home stairway. I CAN identify the probability of my light turning on and off every time as a number between 0 and 1 that expresses the likelihood of the event occurring. I CAN determine if a working switch is more likely or less likely. I CAN predict the approximate probability of the switch circuit working properly.	CCSS.MATH.CONTENT.7.SP.C.5, CCSS.MATH.CONTENT.7.SP.C.6, NGSS.MS-ETS1-1	Probability, Engineering
Snap Circuits (Kit)	SLI-II.C.1.SC.3	Designing Alarm Systems (L3)	Your challenge is to explore all of the types of alarm circuits you might use to keep your home safe and see how many you can build with your Snap Circuits kits.	I CAN create different types of alarm systems that use light and sound sensors. I CAN describe real-world applications for different alarm systems. I CAN describe what integrated circuits are and how they are used. I CAN control the output (alarm volume, duration, etc.) by replacing the components of the circuits. I CAN graph proportional relationships between quantities. I CAN create the equation of a line through the origin.	CCSS.MATH.CONTENT.8.EE.B.5, CCSS.MATH.CONTENT.8.EE.B.6, NGSS.MS-ETS1-2	Linear Equations, Engineering
Tinkercad Circuits (Website)	SLI.C.2.TC.1	Getting Started with Tinkercad Circuits (L1)	Your challenge is to use Tinkercad Circuits to build and test circuits.	I CAN use Tinkercad Circuits to construct electrical circuits that model the behavior of everyday household products. I CAN explain the difference between series and parallel circuits and the benefits and shortcomings of each. I CAN identify different circuit components. I CAN modify electrical circuit models and predict how those changes affect the way my circuits work.	NGSS.MS-ETS1-4	Engineering

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Tinkercad Circuits (Website)	SLI.C.2.TC.2	Problem Solving using micro:bit (L2)	Your challenge is to learn how to use the micro:bit board to solve a problem and create a circuit board to implement a solution.	I CAN use problem solving skills to solve a real world problem. I CAN explain what micro:bit is and how it is used in my problem's solution. I CAN elaborate on each step I used to create the solution to my chosen problem.	CCSS.MATH.CONTENT.7.SP.A.2, NGSS.MS-ETS1-4	Data Collection and Analysis, Engineering
Tinkercad Circuits (Website)	SLI.C.2.TC.3	Arduino Programming (L3)	Your challenge is to use Tinkercad Circuits to build and program circuits with Arduino.	I CAN apply what I know about previous circuit boards to create with Arduino. I CAN use debug errors in my program. I CAN use Arduino to control a different variety of sensors and other components.	NGSS.MS-ETS1-1	Engineering
micro:bit (Kit/Website)	SLII.C.3.MB.1	Emoji (L1)	You will learn how to connect your micro:bit to your computer or tablet and create an emoji using the micro:bit website.	I CAN create a circuit that allows an LED to light. I CAN create a circuit that uses a switch. I CAN create a circuit that uses a button. I CAN code a circuit to make it do something useful or interesting.	N/A	N/A
Vectr (Website)	SLI.CG.1.V.1	Create Custom Logos (L1)	Your challenge is to design your own logos using some or all of these Vectr features: -Selection tools -Type tools -Layers -Drawing tools	I CAN describe the difference between vector and bitmap and when to use each one. I CAN use graphic design skills and techniques, including the use of the following features: selection tools, type tools, drawing tools, and layers. I CAN define supplementary, complementary, vertical, and adjacent angles. I CAN identify supplementary, complementary, vertical, and adjacent angles using graphic design skills and techniques. I CAN use angle relationships to write and solve algebraic equations for unknown angles using Vectr features.	CCSS.MATH.CONTENT.7.G.B.5	Geometric Figures
Tinkercad (Website)	SLI-II.CG.2.T.1	Drawing 3D Objects (L1)	Your challenge is to use Tinkercad to design a 3D shape based on a real-life object or structure.	I CAN use Tinkercad to make simple 3D drawings. I CAN access Tinkercad resources to learn more tools and techniques. I CAN compare vector and bitmap images. I CAN use nets to find the surface area of various shapes. I CAN apply these methods to find the surface area of real objects.	CCSS.MATH.CONTENT.6.G.A.4	Geometric Figures, Multiplication and Division
Tinkercad (Website)	SLI-II.CG.2.T.2	Prototyping (L2)	Your challenge is to come up with your own invention or product idea.	I CAN use Tinkercad to create 3D prototypes. I CAN draw images and calculate the area and circumference. I CAN relate a 3D object to its basic 2D shapes.	CCSS.MATH.CONTENT.7.G.B.4, CCSS.MATH.CONTENT.7.G.B.5, CCSS.MATH.CONTENT.7.G.A.3	Geometric Figures, Multiplication and Division

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Tinkercad (Website)	SLI-II.CG.2.T.3	Scale Modeling (L2)	Your challenge is to create a scale model of an existing object using Tinkercad.	I CAN use Tinkercad to create 3D scale models. I CAN apply the properties of integer exponents to generate equivalent numerical expressions. I CAN use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. I CAN evaluate square roots of small perfect squares and cube roots of small perfect cubes.	CCSS.MATH.CONTENT.8.EE.A.1, CCSS.MATH.CONTENT.8.EE.A.2	Exponents
Photoshop Elements (Software)	SLII.CG.3.PSE.1	Editing Photos (L1)	Your challenge is to explore how scale plays an important role when modifying photos.	I CAN use Photoshop to improve an image. I CAN calculate actual lengths and areas of an object using a scale drawing. I CAN reproduce a scale drawing at a different scale.	CCSS.MATH.CONTENT.7.G.A.1	Geometric Figures
Photoshop Elements (Software)	SLII.CG.3.PSE.2	Selective Color (L2)	Your challenge is to explore selective color techniques in Photoshop Elements and create black-and-white images with color elements.	I CAN create adjustment layers and masks in Photoshop Elements. I CAN use hand-painted layers in Photoshop Elements. I CAN be creative when selecting photos. I CAN be artistic when creating images that are black and white with color elements. I CAN perform operations with numbers expressed in scientific notation. I CAN use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. I CAN interpret scientific notation that has been generated by technology.	CCSS.MATH.CONTENT.8.EE.A.4	Exponents
Fusion 360 (Software)	SLII.CG.4.F360.1	From Tinkercad to Fusion 360 (L1)	Your challenge is to create a simple object in Tinkercad before sending your 3D model to Fusion 360 to add some finishing touches.	I CAN navigate the many tools in Fusion 360. I CAN create detailed drawings of 3D models. I CAN save 3D models to use for 3D printing.	NGSS.MS-ETS1-4	Engineering
Doodle4Google (Website)	SLII.CG.5.DG.1	Create a Doodle (L3)	Your challenge is to use your artistic and creative abilities to create your own version of the Google logo for a holiday or special event.	I CAN use graphic design software to design a creative variation of a logo. I CAN use all four operations to solve real-world and mathematical problems.	CCSS.MATH.CONTENT.7.NS.A.3	Operations with Fractions
Frames (Software)	SLI.DC.1.F.1	Introduction to Stop Motion Animation (L1)	Your challenge is to create a stop-motion animation with Frames and include the standard algorithm for addition, subtraction, multiplication or division of decimals in your stop-motion animation.	I CAN use Frames software to create an animation. I CAN use animation to tell a story. I CAN include the standard algorithm for addition, subtraction, multiplication or division of decimals in my stop-motion animation. I CAN identify multiplicative patterns to calculate the number of frames that will play in my animation.	CCSS.MATH.CONTENT.6.NS.B.3	Multiplication and Division

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Stop Motion Studio Pro 2 (Software)	SLI.DC.1.SMSP.2	Teaching a Math Concept (L2)	Your challenge is to use Stop Motion Studio Pro 2 to create a video teaching a math concept.	I CAN create a video that effectively teaches my peers a new math concept. I CAN use the features of Stop Motion Studio Pro 2, specifically a voiceover, to increase clear communication of an idea or concept. I CAN develop a video and collect peer data to create a highly effective video.	N/A	N/A
Frames (Software)	SLI.DC.1.F.3	Chroma Key (L2)	Your challenge is to create a stop-motion video using Chroma Key.	I CAN use Frames to create an animation. I CAN use Chroma Key to create a background image for an animation with Frames. I CAN set up and take photographs to use with the Chroma Key animation process. I CAN write inequalities to model constraints. I CAN find the greatest common factor and least common multiple between two numbers. I CAN recognize the greatest common factor while using the distributive property.	CCSS.MATH.CONTENT.6.NS.B.4, CCSS.MATH.CONTENT.6.EE.B.8	Multiplication and Division
Stop Motion Studio Pro 2 (Software)	SLI.DC.1.SMSP.3	Demonstrating a Science Experiment (L3)	Your challenge is to create a stop motion video to explain and demonstrate a science experiment.	I CAN use the scientific method to complete a science experiment. I CAN use Stop Motion Studio Pro 2 to demonstrate an engaging experiment. I CAN edit my video to create a well-represented experiment.	N/A	N/A
Frames (Software)	SLI.DC.1.F.4	Animate Your Own Characters (L3)	Your challenge is to create your own characters and then animate them using Frames.	I CAN describe the difference between bitmap and vector graphics. I CAN use Frames software to draw and animate computer-generated characters and backdrops. I CAN create a short animated video with Frames. I CAN tell if a character in a frame is congruent to another. I CAN use the effects of rotation, reflection, and translation to tell a story.	CCSS.MATH.CONTENT.8.G.A.2	Geometric Figures
Comic Life (Software)	SLI.DC.2.CL.1	Historical Stories (L1)	Your challenge is to make a comic recreating a life event of a famous historical figure. You will also be challenged to include a right triangle frame in your template and find the area of the right triangle.	I CAN plan and format my own comic. I CAN determine the area of right triangles. I CAN explain the relationship between the area of right triangles and the area of rectangles.	CCSS.MATH.CONTENT.6.G.A.1	Geometric Figures
Comic Life (Software)	SLI.DC.2.CL.2	Famous Funnies (L2)	Your challenge is to create a funny comic strip based on the styles and examples of popular comic strip writers. Represent the time it will take to draw or color your comic strip using equivalent algebraic expressions.	I CAN plan and format my own comic. I CAN apply the properties of operations to write equivalent expressions.	CCSS.MATH.CONTENT.6.EE.A.3	Variables

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Comic Life (Software)	SLI.DC.2.CL.3	Pictures Worth a Thousand Words (L3)	Your challenge is to create a comic book that summarizes an entire movie or novel of your choice. Take advantage of the efficiency of comic book panels to communicate a detailed story in only a handful of pages.	I CAN plan and format my own comic. I CAN pick out the main parts of a story. I CAN use a comic book format to summarize a detailed story. I CAN describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	CCSS.MATH.CONTENT.8.G.A.3	Geometric Figures
GarageBand (App/Software)	SLI.DC.3.GB.1	Create Your Own Ringtones (L1)	Your challenge is to create personalized ringtones for your closest contacts.	I CAN describe the basic elements of music – beat, tempo, rhythm, volume, and timbre. I CAN use musical elements to affect the mood of a musical piece. I CAN use absolute value to find the magnitude of a positive or negative quantity in a real-world scenario. I CAN make a musical track using loops in GarageBand to represent the mood created by the real-world scenario.	CCSS.MATH.CONTENT.6.NS.C.7.C	Rational Numbers
GarageBand (App/Software)	SLI.DC.3.GB.2	Remixing (L2)	Your challenge is to make your own remix or mashup using GarageBand.	I CAN find similarities between clips of music and then use this knowledge to combine and remix sounds. I CAN describe how copyright law applies to remixing and mashups. I CAN make and solve math expressions with variables and apply them in a real-world scenario.	CCSS.MATH.CONTENT.6.EE.B.6	Variables
GarageBand (App/Software)	SLI.DC.3.GB.3	Composing (L3)	Your challenge is to compose and produce your own original musical masterpiece.	I CAN compose and produce a musical piece that incorporates music from varied sources. I CAN synthesize knowledge of pitch, rhythm, tempo, and style. I CAN collect bivariate data and present the result using a two-way table.	CCSS.MATH.CONTENT.8.SP.A.4	Data Collection and Analysis
PowerPoint (Software)	SLII.DC.4.PPT.1	Importing the Fun Stuff (L2)	Your challenge is to create an engaging PowerPoint presentation covering a subject of your choice.	I CAN add sounds, music, and narration to PowerPoint presentations. I CAN insert animated graphics and movie files. I CAN add hyperlinks. I CAN represent sample spaces for multistage experiments using methods such as organized lists, tables, and tree diagrams. I CAN design and use a simulation to generate frequencies for compound events.	CCSS.MATH.CONTENT.7.SP.C.8.B, CCSS.MATH.CONTENT.7.SP.C.8.C	Probability

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Audio Engineering iPad (App)	SLII.DC.5.AEI.1	Introduction to Music Production (L1)	Your challenge is to compose and record an original song using the Audio Engineering iPad that you can share using a Creative Commons License.	I CAN compose an original song that demonstrates knowledge of how to use song creation software. I CAN write algebraic expressions which represent the notes, octaves, and frequencies used to compose a song to solve problems during the creating process. I CAN create equivalent algebraic expressions by combining like terms, if any are present.	CCSS.MATH.CONTENT.6.EE.A.2.A, CCSS.MATH.CONTENT.6.EE.A.3, CCSS.MATH.CONTENT.6.EE.B.6	Variables
Audio Engineering iPad (App)	SLII.DC.5.AEI.2	Shape Synth (L2)	Your challenge is to create an abstract piece of art made up of geometric shapes by hand, using a technology tool, and using Shape Synth on the Audio Engineering iPad. You will then create an accompanying soundtrack with Shape Synth. You will create unique sounds using the oscillator waveform, add effects, and record it all using a digital cassette tape. Then, you will alter your abstract geometric art based on the change in sounds.	I CAN use an oscillator waveform and sequencer to create different shapes and sounds. I CAN construct different geometric shapes by hand using technology and Shape Synth. I CAN classify different types of triangles. I CAN explain how the amplitude of a wave is related to the energy in the wave.	CCSS.MATH.CONTENT.7.G.A.2, NGSS.MS-PS4-2	Geometric Figures, Waves
Audio Engineering iPad (App)	SLII.DC.5.AEI.3	Do They Correlate? (L3)	Your challenge is to create a song about something important to you, something that will have an emotional impact on others, or something that shares your own thoughts and feelings. Conduct a survey about certain aspects of music, create a scatter plot, and analyze the bivariate data to help with creating a song that better appeals to your audience.	I CAN construct and interpret a scatter plot for bivariate measurement data to analyze the song detail interests of my audience. I CAN investigate and describe patterns associated between two quantities using a scatter plot to make my song more appealing to my audience. I CAN identify patterns between two variables to make improvements to my song. I CAN create a song that is meaningful to me using GarageBand.	CCSS.MATH.CONTENT.8.SP.A.1	Data Collection and Analysis
Google Sites (Website)	SLII.DC.6.GGS.1	My First Website (L1)	Your challenge is to learn how to create websites easily using Google Sites templates.	I CAN create a website using Google Sites templates. I CAN recognize a statistical question. I CAN write statistical questions that would provide data about who is visiting my website.	CCSS.MATH.CONTENT.6.SP.A.1	Data Collection and Analysis
Google Sites (Website)	SLII.DC.6.GGS.2	Creating a Website From Scratch (L2)	Your challenge is to design and build the structure and content for your site from scratch.	I CAN create a website from a blank template. I CAN plan and organize website content and structure. I CAN describe qualitatively the functional relationship between two quantities by analyzing a graph. I CAN sketch a graph that exhibits the qualitative features of a function that has been described verbally.	CCSS.MATH.CONTENT.8.F.B.5	Functions

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Google Sites (Website)	SLII.DC.6.GGS.3	Using Google Forms (L3)	Your challenge is to build a Google Form to collect useful information about your audience.	I CAN create a Google form. I CAN insert a form into a web page. I CAN organize and analyze information. I CAN recognize, ask, and answer a statistical question.	CCSS.MATH.CONTENT.6.SP.A.1	Data Collection and Analysis
Google Sites (Website)	SLII.DC.6.GGS.4	Google Forms and Marketing Strategy (L3)	Your challenge is to build a Google Form to collect useful information about your audience.	I CAN create a Google Form. I CAN insert a Google Form into a web page. I CAN organize and analyze information. I CAN collect and analyze survey information. I CAN interpret the slope and intercept of a linear equation. I CAN solve a linear equation using bivariate measurement data.	CCSS.MATH.CONTENT.8.SP.A.3	Data Collection and Analysis
Premiere Elements (Software)	SLII.DC.7.PE.1	Recreate Your Favorite Movie Scene (L2)	Your challenge is to film and edit a short video of you creating each of the transformations (reflection, rotation, and translation). Then, recreate your favorite movie scene with Adobe Premiere Elements.	I CAN use different camera heights, angles, and movement in filmmaking. I CAN describe frame composition and the “Rule of Thirds”. I CAN create a video clip of rotated geometric shapes and objects in the coordinate plane. I CAN create a video clip of reflected geometric shapes and objects in the coordinate plane. I CAN create a video clip of translated geometric shapes and objects in the coordinate plane.	CCSS.MATH.CONTENT.8.G.A.1	Geometric Figures
Storyboarding (Software)	SLII.DC.8.SB.1	Creating Video Storyboards (L2)	Create a storyboard for your own film idea.	I CAN describe the Four Cs (story-telling elements that every great film needs). I CAN find quotients when dividing with fractions. I CAN use a model to explain the quotient when dividing with fractions.	CCSS.MATH.CONTENT.6.NS.A.1	Operations with Fractions, Multiplication and Division
Lux Blox (Kit)	SLI.MS.1.LB.1	Explore Probability (L1)	Your challenge is to use Lux Blox building pieces to explore probability.	I CAN express the probability of an event as a number between 0 and 1. I CAN classify the probability of a given event as likely, unlikely, or neither.	CCSS.MATH.CONTENT.7.SP.C.5	Probability
Engino (Kit)	SLI.MS.2.E.1	Building Bridges (L1)	Your challenge is to use Engino Architecture Kit pieces to build a variety of structures to understand how different shapes work together to create strong buildings and bridges.	I CAN build a variety of structural models with Engino. I CAN rewrite an equation in different forms to understand deformation. I CAN measure deformation and/or flex to test the strength of my bridges.	CCSS.MATH.CONTENT.7.EE.A.2, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Operations with Fractions, Multiplication and Division, Engineering

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
ArcKit (Kit)	SLI-II.MS.3.A.1	Build Your Own House (L1)	Your challenge is to use the architectural design process to build a scale model of your own house with Arckit.	I CAN build a model that meets the design criteria and constraints. I CAN create a technical drawing or plan using correct scale proportions. I CAN describe the architectural design process and how I used it to design my own home. I CAN use ratio language to describe a ratio relationship between two quantities.	CCSS.MATH.CONTENT.6.RP.A.1, NGSS.MS-ETS1-1	Ratios, Engineering Design
ArcKit (Kit)	SLI-II.MS.3.A.2	Modernizing a Classic (L2)	Your challenge is to modernize a classic architectural design in an effort to make it more eco-friendly.	I CAN write an architectural proposal letter. I CAN research the architecture of historic structures. I CAN address the problem of ecological impact in architectural designs. I CAN build an architectural model of an original structure.	CCSS.MATH.CONTENT.7.G.A.1, NGSS.MS-LS2-5, NGSS.MS-ETS1-1	Geometric Figures, Ecosystems, Earth and Human Activity
ArcKit (Kit)	SLI-II.MS.3.A.3	Tiny Houses (L3)	Your challenge is to design a tiny house and build a model of your creation.	I CAN use scale and proportion to build a tiny house. I CAN discuss the pros and cons of living in a tiny house. I CAN discuss the environmental impacts of living in a tiny house. I CAN complete a cost analysis of living in tiny and average sized homes. I CAN create a pamphlet to inform and persuade an audience.	NGSS.MS-ESS3-4, NGSS.MS-LS2-5, NGSS.MS-ETS1-1	Ecosystems, Earth and Human Activity
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.1	Machines and Gears (L1)	Your challenge is to learn how machines use gears to operate by building a variety of machines with fischertechnik.	I CAN compare and contrast a variety of machines that use gears to operate. I CAN explain the differences between types of gears and how they work.	NGSS.MS-ETS1-2	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.2	The World of Statics (L1)	Your challenge is to design a tower using the principles of statics.	I CAN apply basic principles of statics to design and build a tower. I CAN explain how trusses and bracing are used to support static structures.	NGSS.MS-ETS1-2	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.3	Building Bridges (L1)	Your challenge is to construct and test existing bridge designs to understand what makes a bridge strong enough to withstand certain forces. Your task is to use this experience and your knowledge of statics to design and construct your own efficient and effective bridge.	I CAN build a variety of bridges with fischertechnik. I CAN compare bridge structures and how their designs impact compression and tension forces on the bridge.	NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.4	Heavy Loads (L2)	Your challenge is to build machines that use leverage to lift heavy loads. You will calculate the mechanical advantage and determine if you can redesign the machines to improve this ratio.	I CAN design a machines to solve an engineering problem. I CAN measure and calculate the mechanical advantage of a compound machine. I CAN use collected data to identify and make improvements to my design to improve the mechanical advantage.	NGSS.MS-ETS1-1, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.5	Levers and Scales (L2)	Your challenge is to build and test your own balance scales and learn how scales are engineered to measure weight.	I CAN explain how mechanical principles and levers are applied to the design and use of balance scales.	NGSS.MS-ETS1-1, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.6	A Car Full of Gears (L3)	Your challenge is to make gear system improvements to the vehicle so that it can withstand the mountainous terrain and wild weather patterns.	I CAN explain how gears perform a variety of functions in modern vehicles. I CAN apply mechanical principles and my knowledge of gears to solve an engineering problem. I CAN build, test, and modify designs to improve outcomes according to an engineering problem.	NGSS.MS-ETS1-1, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.7	The Marvelous Mixer (L3)	Your challenge is to use fischertechnik to design and build your own electric mixer from scratch. What kind of food do you want to mix? Test the effectiveness of you initial design on a bowl of your chosen food, and then compare your design with the recommended fischertechik mixer design instructions. Use this comparison to improve your own design to better meet your needs.	I CAN define a design problem and determine a solution that meets the needs and constraints of the problem. I CAN design, build, and test my mixer. I CAN improve my mixer to better meet the design problem needs.	NGSS.MS-ETS1-1, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering
fischertechnik Mechanics 2.0 (Kit)	SLI-II.MS.4.FTM.8	Super Crane Challenge (L3)	Your challenge is to build a model crane and modify it using principles of both statics and mechanics to maximize the load weight you can lift.	I CAN explain how compound pulleys are used to gain mechanical advantage. I CAN define a design problem and determine a solution that meets the needs and constraints of the problem. I CAN design, build, and test my crane. I CAN improve my crane to better meet the design problem needs.	NGSS.MS-ETS1-1, NGSS.MS-ETS1-2, NGSS.MS-ETS1-3	Engineering
Bridge Designer (Software)	SLII.MS.5.BD.1	Exploring Virtual Bridge Design (L1)	Your challenge is to use Bridge Designer to engineer a cost-effective truss bridge that will support a two-lane highway across the river valley.	I CAN identify the four different types of bridges. I CAN use compression and tension forces to support a truss bridge. I CAN apply the engineering design process. I CAN use Bridge Designer to engineer a bridge. I CAN apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients.	CCSS.MATH.CONTENT.7.EE.A.1.	Geometric Figures, Operations with Fractions, Engineering

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Bridge Designer (Software)	SLII.MS.5.BD.2	Design Decisions with Estimation (L2)	Your challenge is to come up with an accurate estimate for how much it will cost to rebuild a suspension bridge and use your knowledge of triangles and angles to explain your design.	I CAN interpret load test analysis and use it to make design decisions. I CAN decrease cost by selecting the smallest possible member size for the required strength. I CAN use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle–angle criterion for similarity of triangles. I CAN explain a proof of the Pythagorean theorem and its converse.	CCSS.MATH.CONTENT.8.G.A.5, CCSS.MATH.CONTENT.8.G.B.6	Variables, Engineering
VEX IQ (Kit/Software)	SLI-II.RCT.2.VEXIQ.1	Basic Self Driving Car (L1)	Your challenge is to build and program a simple self-driving car using VEX IQ. Practice your programming skills by planning a route through a maze that you design.	I CAN build and program a self-driving robot car to drive through a course without external help. I CAN design a challenging course for my self-driving car. I CAN explain what a robot is and what they are capable of.	NGSS.MS-ETS1-1	Engineering
VEX IQ (Kit/Software)	SLI-II.RCT.2.VEXIQ.2	The Basics (L1)	Your challenge is to give the VEX IQ specific instructions to get from A to B.	I CAN navigate a path using control technology and by creating a code sequence. I CAN use block code to apply coding concepts to make the VEX IQ navigate a path. I CAN use block code to make my VEX IQ deliver and/or pick up and drop off an object(s) at an appointed area. I CAN test and refine my program under different conditions. I CAN make a table of equivalent ratios to investigate the possibilities of robot movement based on finding missing values and compare them to other ratios. I CAN plot pairs of values that represent equivalent ratios on a coordinate plane. I CAN apply the concept of unit rate to calculate the constant speed of the robot.	CCSS.MATH.CONTENT.6.RP.A.3.A	Ratios
VEX IQ (Kit/Software)	SLI-II.RCT.2.VEXIQ.3	The Clawbot (L2)	Your challenge is to build and program a robot with a claw attachment that is capable of remote control and autonomous operation.	I CAN use VEX IQ to build a Clawbot robot. I CAN use a VEX IQ Controller to remotely control the Clawbot's movements. I CAN use VEXcode software to program the Clawbot to perform autonomous tasks.	NGSS.MS-ETS1-1	Engineering

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
VEX IQ (Kit/Software)	SLI-II.RCT.2.VEXIQ.4	Virtual Reality (L3)	Your challenge is to use VR to program the VEX IQ robot. You will select different playgrounds to practice your coding skills and apply your knowledge of lines, angles, translations and rotations in order to navigate your robot and record your own algorithm.	I CAN launch a program in VEX VR. I CAN create a project using block code. I CAN load and save VR projects using macOS, iPad, Chromebook, Windows, or Android. I CAN use timers and playground features. I CAN program my robot to rotate x degrees in order to turn. I CAN create a block code using parallel lines and rotations.	CCSS.MATH.CONTENT.8.G.A.1, CCSS.MATH.CONTENT.8.G.A.1.A, CCSS.MATH.CONTENT.8.G.A.1.B, CCSS.MATH.CONTENT.8.G.A.1.C	Geometric Figures
RoboMaster S1 (Kit/Software)	SLII.RCT.3.PE.1	Search and Rescue with Scratch Programming (L1)	Your challenge is to program the RoboMaster S1 to search for a person and alert when he/she is detected.	I CAN program a robot to respond to data gathered by sensors. I CAN identify locations in a searchable area by describing their distance from zero. I CAN use absolute value to compare the distance from zero for locations in my searchable area.	CCSS.MATH.CONTENT.6.NS.C.7.C	Rational Numbers
Alternative Energy (Website)	SLI-II.S.1.AE.1	Introduction to Alternative Energy (L1)	Your challenge is to learn how to be a smart consumer of information.	I CAN collect and share important facts about renewable energy. I CAN describe and identify parts of a mathematical expression. I CAN evaluate expressions at different values. I CAN complete a Claims-Evidence-Reasoning writing prompt.	CCSS.MATH.CONTENT.6.EE.A.2.B, CCSS.MATH.CONTENT.6.EE.A.2.C	Variables
Alternative Energy (Website)	SLI-II.S.1.AE.2	Home Efficiency Exploration (L2)	Your challenge is to perform an energy audit of your own home.	I CAN perform an energy audit. I CAN identify cost-effective energy-saving methods. I CAN create math expressions to solve word problems. I CAN set limitations with inequalities to lower my energy bill. I CAN solve two-step equations. I CAN solve inequalities and graph the solutions.	CCSS.MATH.CONTENT.7.EE.B.4.A, CCSS.MATH.CONTENT.7.EE.B.4.B, NGSS.MS-ESS3-3	Variables, Earth and Human Activity
Alternative Energy (Website)	SLI-II.S.1.AE.3	Capstone Project (L3)	Your challenge is to pick a topic that you found interesting during your exploration in renewable energy: hydrogen fuel cells, wind power, solar power, and other alternative energy topics. Then, with a team, plan, research, and create systems of equations surrounding cost comparison. Finally, you and your team will build a model informational kiosk, create a website, produce a video, or choose another communication method to educate friends, family, or classmates about your topic.	I CAN communicate ideas in an informative and engaging way. I CAN solve systems of two linear equations in two variables algebraically to compare alternative energy costs. I CAN recognize that parallel lines have no solution and the same slope but different y-intercepts. I CAN recognize that two equations with the same slope and the same y-intercept have infinite solutions. I CAN solve real-world problems about alternative energy costs leading to two linear equations in two variables.	CCSS.MATH.CONTENT.8.EE.C.8, CCSS.MATH.CONTENT.8.EE.C.8.A, CCSS.MATH.CONTENT.8.EE.C.8.B, CCSS.MATH.CONTENT.8.EE.C.8.C, NGSS.MS-ESS3-4	Linear Equations, Earth and Human Activity

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
fischertechnik Green Energy (Kit)	SLI-II.S.2.FTGE.1	Alternative Energy (L1)	Your challenge is to decide what form of alternative energy is best to generate electricity in your location based on research and data collection.	I CAN build a model using a Fischertechnik kit. I CAN compare and contrast different forms of green energy. I CAN design an experiment to collect quantitative and qualitative data about my energy source. I CAN justify my recommendations for types of energy to be used based on the analysis of my data.	NGSS.MS-ESS3-3, NGSS.MS-ETS1-2	Earth and Human Activity, Engineering
fischertechnik Green Energy (Kit)	SLI-II.S.2.FTGE.2	Hydrogen Fuel Cell Car (L2)	Your challenge is to learn how to construct a hydrogen fuel cell. You will then connect it in series with another alternative energy source to power a vehicle.	I CAN construct and use a hydrogen fuel cell for a moving vehicle. I CAN make modifications to a design to make a faster vehicle. I CAN design and test multiple solutions to a problem.	NGSS.MS-PS1-2, NGSS.MS-ETS1-1	Matter, Engineering
fischertechnik Green Energy (Kit)	SLI-II.S.2.FTGE.3	Power a Tiny House (L3)	Your challenge is to build a renewable energy power system that, when scaled up, can power a tiny house.	I CAN create a system that generates electricity through renewable energy. I CAN use scale factor to determine how my system would need to be scaled up to power a real tiny house. I CAN use real world data to design a power system.	CCSS.MATH.CONTENT.8.EE.C.7.a, NGSS.MS-ESS3-3, NGSS.MS-ETS1-4	Linear Equations, Earth and Human Activity, Engineering
Extreme Weather (Website)	SLI.SDA.1.EW.1	Weather, Climate, and Monster Storms (L1)	Your challenge is to choose a weather, climate, or monster storm topic to explore in depth.	I CAN research a topic and share my knowledge. I CAN construct histograms using Google Sheets. I CAN analyze the data from histograms.	CCSS.MATH.CONTENT.6.SP.B.4, NGSS.MS-ESS3-2, NGSS.MS-ESS3-5	Data Collection and Analysis, Distributions, Earth and Human Activity, Earth Systems
Extreme Weather (Website)	SLI.SDA.1.EW.2	Tornadoes (L2)	Your challenge is to choose a topic about tornadoes to explore and then present your information.	I CAN research a topic and share my knowledge. I CAN describe how tornadoes form. I CAN compare two tornado-related datasets visually. I CAN express the median difference between datasets as a multiple of variation (spread).	CCSS.MATH.CONTENT.7.SP.B.3, NGSS.MS-ESS3-2, MS-ESS2-5	Data Collection and Analysis, Distributions, Earth and Human Activity, Earth Systems
Extreme Weather (Website)	SLI.SDA.1.EW.3	Earth's Energy Budget (L3)	Your challenge is to explore energy, atmosphere, and storms with science experiments you can do right in the SmartLab.	I CAN measure and analyze the effects to predict weather and storms. I CAN plan and present information. I CAN conduct an experiment to simulate the Sun's energy on Earth. I CAN analyze and interpret graphs. I CAN construct a function to model a linear relationship between two quantities. I CAN write a linear function from the collected data. I CAN write a linear function that models a graph of collected data.	CCSS.MATH.CONTENT.8.F.B.4, NGSS.MS-ESS2-2, NGSS.MS-ESS2-5	Functions, Earth and Human Activity, Earth Systems

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Stellarium (Software)	SLI.SDA.2.STEL.1	Exploring the Celestial Sphere (L1)	Your challenge is to find interesting things in the night sky using a catalogue of unique objects, specific bodies in our solar system, or objects found in your favorite constellation.	I CAN use the Stellarium search, location, date and time, and label tools. I CAN describe astronomical distances and brightness. I CAN explain what constellations are and how they relate to the celestial sphere. I CAN use positive and negative numbers to order celestial objects by brightness. I CAN calculate how many times fainter one object is when compared to another.	CCSS.MATH.CONTENT.6.NS.C.5, NGSS.MS-ESS1-3	Rational Numbers, The Universe, Solar Systems
Stellarium (Software)	SLI.SDA.2.STEL.2	The Sky in Motion (L2)	Your challenge is to become familiar with the basics of tracking astronomical motion.	I CAN explain how the motions of Earth and other astronomical objects affect the motions we see in the sky. I CAN use common types of coordinates to find and track astronomical objects. I CAN use coordinates, mounting, and time controls to better observe motions in Stellarium. I CAN represent two quantities in a real-world problem that change in relationship to one another. I CAN use equations, tables, and graphs to analyze the relationship between two variables.	CCSS.MATH.CONTENT.6.EE.C.9, NGSS.MS-ESS1-3	Variables, The Universe, Solar Systems
Stellarium (Software)	SLI.SDA.2.STEL.3	Astronomical Predictions (L3)	Your challenge is to use the Stellarium calculation tools to plan a night of stargazing in your area.	I CAN use Stellarium's calculation tools to predict and plan outdoor observations. I CAN construct scatter plots. I CAN describe the relationship between two variables.	CCSS.MATH.CONTENT.8.SP.A.1, NGSS.MS-ESS1-1	Distributions, The Universe, Solar Systems
Google Earth (Software)	SLII.SDA.3.GGE.1	Mapping Your World (L1)	Your challenge is to choose a place that interests you, create a map of your own, and create a coordinate plane over your map to apply your understanding of ordered pairs, opposites, and quadrants.	I CAN use a map to communicate information. I CAN identify zero on a number line in relation to positive and negative numbers. I CAN recognize opposite signs of a number as seen on a coordinate plane on a map. I CAN recognize the signs of both numbers in an ordered pair and identify them on a map. I CAN recognize a reflection over the y-axis on a map. I CAN recognize a reflection over the x-axis on a map.	CCSS.MATH.CONTENT.6.NS.C.6.A	Rational Numbers
Google Earth (Software)	SLII.SDA.3.GGE.2	Multimedia Tours (L2)	Your challenge is to explore advanced customization techniques as you create your own narrated Google Earth Pro tour.	I CAN use a map to communicate information. I CAN use longitude and latitude to locate specific points on Google Earth. I CAN compare and contrast globes and maps. I CAN use random sampling to identify locations using Google Earth. I CAN make inferences about a location based on random sampling of sites at that location using Google Earth.	CCSS.MATH.CONTENT.7.SP.A.1, CCSS.MATH.CONTENT.7.SP.A.2	Data Collection and Analysis, Distributions

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Google Earth (Software)	SLII.SDA.3.GGE.3	Mobile Apps (L3)	Your challenge is to learn how to collect information with a smartphone or other GPS device and analyze it using Google Earth.	I CAN use a map to communicate information. I CAN visually represent information using GIS. I CAN describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. I CAN understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	CCSS.MATH.CONTENT.8.G.A.3, CCSS.MATH.CONTENT.8.G.A.4	Geometric Figures
MicroObservatory (Software)	SLII.SDA.4.MO.1	An Introduction (L1)	Your challenge is to explore MicroObservatory to learn how to analyze your images. Then, program a telescope to take a picture of an astronomical object of your choice!	I CAN remotely use telescopes to take photographs of astronomical objects. I CAN collect data to answer a statistical question. I CAN analyze the distribution of data I collect to look for its center, spread, and overall shape.	CCSS.MATH.CONTENT.6.SP.A.2, NGSS.MS-ESS1-3	Data Collection and Analysis, Distributions, Solar Systems, The Universe
MicroObservatory (Software)	SLII.SDA.4.MO.2	Using Telescopes to Understand Our Universe (L2)	Your challenge is to use MicroObservatory Image Software to better understand how astronomers use telescopes to see the universe.	I CAN describe how my eye compares to a telescope for the following characteristics: -Apertures & pupils -Shutter speed & reaction time -Seeing distant objects -Field of view -Rods, cones, & color I CAN calculate mean, median, mode, range, mean absolute deviation, and interquartile range. I CAN make informal comparisons based on data from two different populations.	CCSS.MATH.CONTENT.7.SP.B.4, NGSS.MS-LS1-8	Variability, Distributions, Human Body
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.1	Measuring Temperature (L1)	Your challenge is to choose from 12 experiments that use Vernier probes and software to measure and analyze temperature data for many real-world situations.	I CAN use the Vernier temperature probe to record and analyze scientific data using integers to represent the temperature. I CAN identify an integer and its opposite from the data collected. I CAN explain where zero fits into the data collected. I CAN find and position integers and other rational numbers on a horizontal or vertical number line. I CAN find and position integers and other rational numbers on a coordinate plane.	CCSS.MATH.CONTENT.6.NS.C.5, CCSS.MATH.CONTENT.6.NS.C.6, NGSS.MS-PS3-4	Rational Numbers, Energy

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.2	Reflectivity of Light (L1)	Your challenge is to learn about wavelengths and color attributes of light. Use Vernier light sensors to learn how different colors and materials reflect and absorb light.	I CAN use Vernier software to record and analyze scientific data. I CAN use the reflectivity formula and run a reflectivity light experiment using the Vernier Sensor Light. I CAN calculate percent reflectivity of various colors. I CAN decide whether two quantities are in a proportional relationship. I CAN test for equivalent ratios in a data table.	CCSS.MATH.CONTENT.7.RP.A.2.A, NGSS.MS-PS4-2	Ratios, Waves
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.3	A Distant Light (L1)	Your challenge is to use Vernier light sensors to measure sunlight on other “planets” in a model solar system.	I CAN measure light intensity distances between different planets and the Sun. I CAN use Vernier light sensors. I CAN use the Vernier LabQuest 3. I CAN record and analyze scientific data by manipulating Vernier LabQuest 3.	CCSS.MATH.CONTENT.7.RP.A.2.B, MS-ESS1-3	Ratios, The Universe, Solar Systems
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.4	Measuring Heart Rates (L2)	Your challenge is to use the Vernier Hand-Grip Heart Rate Monitor to conduct a variety of experiments on heart rates and human physiology.	I CAN use Vernier to record and analyze scientific data. I CAN use the mean and mean absolute deviation to compare two datasets. I CAN compare and make conclusions on data from two randomly sampled populations.	CCSS.MATH.CONTENT.7.SP.B.3, CCSS.MATH.CONTENT.7.SP.B.4, NGSS.MS-LS1-3	Variability, Distributions, Human Body
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.5	Measuring Motion (L2)	Your challenge is to use Vernier ultrasonic sound sensors to collect bivariate data and analytical software to create graphical representations of that data.	I CAN use Vernier to record and analyze scientific data. I CAN construct and interpret scatterplots for bivariate measurement data to investigate patterns of association between two quantities. I CAN describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. I CAN identify how straight lines are widely used to model relationships between two quantitative variables. I CAN informally fit a straight line on a scatterplot graph and informally assess the model fit by judging the closeness of the data points to the line.	CCSS.MATH.CONTENT.8.SP.A.1, CCSS.MATH.CONTENT.8.SP.A.2, NGSS.MS-PS4-2	Variability, Distributions, Waves
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.6	Heart Rate Advanced Exploration (L3)	Your challenge is to design your own research experiment using the Vernier heart rate monitor, computer interface, and analytical software.	I CAN use Vernier to record and analyze scientific data. I CAN design an experiment of my own to investigate changes in heart rate. I CAN make a graph from collected data. I CAN write a linear function from the collected data. I CAN write a linear function that models a graph of collected data.	CCSS.MATH.CONTENT.8.F.B.4, NGSS.MS-LS1-3	Linear Equations, Human Body

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Vernier Secondary Sensing Science (Kit/Software)	SLI-II.SDA.5.VSSS.7	Environmental Study (L3)	Your challenge is to conduct an environmental study to look at the relationship between light and temperature using Vernier sensors and software to collect and analyze data in an outside environment.	I CAN use Vernier to record and analyze scientific data. I CAN use the Vernier temperate and light sensors in combination to research environmental conditions. I CAN use scientific notation when comparing and analyzing data. I CAN identify the trendline or correlation in a scatter plot.	CCSS.MATH.CONTENT.8.EE.A.4, CCSS.MATH.CONTENT.8.SP.A.1, NGSS.MS-PS3-4	Distributions, Exponents, Energy
Kodu (Software)	SLI.SE.1.K.1	Computer Game Design (L1)	Your challenge is to create your first computer game with Kodu.	I CAN write simple computer code to control object behaviors. I CAN understand that equations and inequalities are solved with values that could make them true. I CAN substitute numbers to determine whether a given equation or inequality is true.	CCSS.MATH.CONTENT.6.EE.B.5	Variables
Kodu (Software)	SLI.SE.1.K.2	Programming Complex Behaviors (L2)	Your challenge is to use Kodu to create a complex computer game.	I CAN use intermediate programming skills to program a computer game. I CAN add complex behaviors and multiple pages to a computer game. I CAN access and change settings for characters and objects in a computer game. I CAN improve an existing game or create my own computer game. I CAN develop and apply a uniform probability model to a computer game. I CAN study the chance of outcomes occurring and develop a probability model from the results.	CCSS.MATH.CONTENT.7.SP.C.7.A, CCSS.MATH.CONTENT.7.SP.C.7.B	Probability
Kodu (Software)	SLI.SE.1.K.3	Creating a Game From Scratch (L3)	Your challenge is to design a game that will interest your users so they will continue to play it.	I CAN add complex behaviors and multiple pages for a character. I CAN access and change settings for characters and objects. I CAN describe qualitatively the functional relationship between two quantities by analyzing a graph. I CAN sketch a graph that exhibits the qualitative features of a function that has been described verbally.	CCSS.MATH.CONTENT.8.F.B.5, NGSS.MS-ETS1-3	Functions, Engineering
Scratch v3 (Software)	SLI-II.SE.2.S.1	Programming an Animation (L1)	Your challenge is to use Scratch to create an original math animation.	I CAN use Scratch to program a computer animation. I CAN use Scratch operator blocks to represent and solve for numerical expressions involving exponents. I CAN write and evaluate a numerical expression with exponents.	CCSS.MATH.CONTENT.6.EE.A.1	Exponents

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
Scratch v3 (Software)	SLI-II.SE.2.S.2	Animated Greeting Cards (L2)	Your challenge is to use Scratch to create an animated, interactive greeting card.	I CAN import images for sprites and backgrounds into Scratch. I CAN record and import sounds into Scratch. I CAN design and program an animated greeting card in Scratch. I CAN use ratios of fractions to program the rotational speed for objects in my Scratch animation.	CCSS.MATH.CONTENT.7.RP.A.1	Ratios
Scratch v3 (Software)	SLI-II.SE.2.S.3	Intermediate Programming (L2)	Your challenge is to program a Scratch sprite to solve multi-step problems involving percentages, specifically tips (gratuity), sales tax, and interest.	I CAN use Scratch tools and techniques to write a computer program. I CAN use proportional relationships to solve real-world percent problems. I CAN use block coding to write programs that solve mathematical equations.	CCSS.MATH.CONTENT.7.RP.A.3	Ratios
Scratch v3 (Software)	SLI-II.SE.2.S.4	Computer Animation (L3)	Your challenge is to create and tell your own interactive computer animation involving small and large quantities using Scratch.	I CAN use traditional and modern techniques to animate a story. I CAN use Scratch to create more complex and engaging animations. I CAN express very small and very large numbers using scientific notation. I CAN compare quantities expressed in scientific notation.	CCSS.MATH.CONTENT.8.EE.A.3	Exponents
Scratch v3 (Software)	SLI-II.SE.2.S.5	Designing Computer Games (L3)	Your challenge is to design and program your own interactive computer game as you learn advanced programming techniques in Scratch.	I CAN apply advanced computer programming skills to design a computer game. I CAN develop a computer game based upon major components of all games: goals, rules, challenges, interactions. I CAN construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. I CAN use relative frequencies calculated for rows or columns to describe possible association between the two variables.	CCSS.MATH.CONTENT.8.SP.A.4	Data Collection and Analysis
MakeCode Arcade (Website)	SLI-II.SE.3.MC.1	Getting Started with MakeCode Arcade (L1)	Your challenge is to modify a completed MakeCode Arcade tutorial or existing game to make it your own.	I CAN successfully complete a beginner-level coding tutorial in Microsoft MakeCode Arcade. I CAN use an existing program (such as the one I created during the tutorial) and modify it to include elements of game design that make it my own. I CAN explain how programming techniques like events, loops, variables, and if/then conditions work together to make my game come to life. I CAN write and debug code to create an organized, logical, and functional game.	N/A	N/A

Middle School Project Starters (continued)

Resource	SOT Code	Project Starter	Your Challenge	I CAN Statements	Targeted Standards	Topics Addressed
MakeCode Arcade (Website)	SLI-II.SE.3.MC.2	Designing Themed Games (L2)	Your challenge is to create your own themed block-code video game using MakeCode Arcade.	I CAN plan and use block-coding, including loops, functions, and conditionals to create a themed video game. I CAN define rational numbers and provide examples to use within my video game. I CAN create and solve real-world problems involving the four operations with rational numbers as an obstacle in a video game I created.	CCSS.MATH.CONTENT.7.NS.A.3	Rational Numbers
MakeCode Arcade (Website)	SLI-II.SE.3.MC.3	Designing a MultiPart Game (L3)	Your challenge is to design a multi-part game in MakeCode Arcade.	I CAN plan and use code to design an online multi-part game using MakeCode Arcade. I CAN create steps to take with specific parameters to help organize code to reuse efficiently. I CAN use compound conditionals and nested loops to enhance the game code. I CAN distinguish between rational and irrational numbers.	N/A	N/A