Teacher: **Shelly Beers**	Course: **STEAM 7**	Grade Level(s): **7**

Quarter Course	Quarter Course broken down by days (45-day quarter) Topic(s): **Problem-Solving; Makey Makey; Coding; Sphero; Simple Machines/Rube Goldberg**
Content/Big Ideas	• Students will begin to understand the importance of problem-solving strategies and teamwork within the Makerspace setting. (BreakoutEDU – 1 day) • Students will learn how to complete a circuit. (MakeyMakey & Paper Circuits – 7 days) • Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study. (Khan Academy – 12 days) • Students will learn Scratch code to program Sphero robots to accomplish various tasks. (Sphero – 9 days) • Students will recognize the use of simple machines in everyday life through research. (Simple Machines – 3 days). • Students will use simple machines to create a Rube Goldberg Machine that will accomplish a given task (Rube Goldberg Machine – 11 days). [Welcome/Course expectations – 1 day; Course wrap-up – 1 day]
Essential Questions	• How is problem-solving used in your everyday life? And why is it important to learn problem-solving skills? (all projects) • Why is understanding how circuits work important to our lives? (MakeyMakey and Paper Circuits) • In what ways are technology and other fields of study connected? (Khan Academy) • How do graphing concepts overlap with JavaScript coding? (Khan Academy) • How does Scratch coding relate to JavaScript coding and which type of coding is more easily used in this class? (Sphero) • How do simple machines make our lives easier? (Simple Machines and Rube Goldberg Machine)

Concepts	- Students will develop an appreciation for learning problem-solving strategies to use in all aspects of their lives. - Students will learn how to complete simple circuits. (Paper Circuits and MakeyMakey) - Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study. (Khan Academy) - Students will learn Scratch coding. (Sphero) - Students will use mathematical computations (angles and velocity) in order to program Sphero to successfully complete a student-made maze using automation. (Sphero) - Students will research the six different kinds of simple machines, define each kind of simple machine, describe how each kind of simple machine makes doing work easier, and provide five real-world examples of each kind of simple machine. (Simple Machines) - Students will use their knowledge of simple machines to create a Rube Goldberg Machine that will run for a predetermined time and will accomplish a predetermined task. (Rube Goldberg Machine)
Competencies	- Problem-solving techniques need to become part of students' normal thought process in all aspects of their lives. - Circuits are the backbone of all electronics used. - The study of technology uses many of the same ideas and skills as other subjects. - Various relationships exist between technology and other fields of study. - Knowledge gained from other fields of study has a direct effect on the development of technological products and systems. - Simple machines are the basic components to most machines and simple machines that work together create complex machines. - Machines make doing simple work (like lifting a box) easier.

Standards/Benchmarks	ISTE 1a – Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes (Sphero). ISTE 3a – Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits (BreakoutEDU). ISTE 3b – Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions (Simple Machines/Rube Goldberg Machine). ISTE 4a – Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems (BreakoutEDU, Rube Goldberg Machine). ISTE 4b – Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks (BreakoutEDU, Sphero, Rube Goldberg Machine). ISTE 4c – Develop, test and refine prototypes as part of a cyclical design process (Rube Goldberg Machine). ISTE 4d – Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems (BreakoutEDU, Sphero, Rube Goldberg Machine). ISTE 5a – Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions (MakeyMakey, Khan Academy, Sphero). ISTE 5d – Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions (Sphero). ISTE 6a – Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication (Khan Academy). ISTE 6c – Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations (Paper Circuits, MakeyMakey, and Khan Academy).

Activities & Assessments	- Students will work in groups and use BreakoutEDU to solve numerous problems in order to unlock the BreakoutEDU box. - Students will be able to complete a simple circuit using a paper template, copper tape, a coin battery, and an LED light. (Paper Circuits) - Students will be able to complete a parallel circuit using a paper template, copper tape, a coin battery, and an LED light. (Paper Circuits) - Students will be able to complete a series circuit using a paper template, copper tape, a coin battery, and an LED light. (Paper Circuits) - Students will choose various objects that may or may not conduct electrical current to complete circuits. (MakeyMakey) - Students will create an "Operation"-type game using MakeyMakeys to demonstrate their knowledge of circuitry. (MakeyMakey) - Students will learn JavaScript code utilizing the Hour of Code platform through KhanAcademy.org. - Throughout the platform students will complete: - Simple snowman - Waving snowman - Sunny snowy day - Super snowman project - Self-portrait project - Wild animal project - Students will use mathematical computations (angles and velocity) in order to program Sphero to successfully complete a student-made maze using automation. (Sphero) - Students will research the six different kinds of simple machines, define each kind of simple machine, describe how each kind of simple machine makes doing work easier, and provide five real-world examples of each kind of simple machine. (Simple Machines) - Students will use their knowledge of simple machines to create a Rube Goldberg Machine that will run for a predetermined time and will accomplish a predetermined task. (Rube Goldberg Machine)