Primary MakerSpace Curriculum Framework

Background Information

MakerSpace is broadly defined as "a place in which people with shared interests, especially in computing or technology can gather to work on projects while sharing ideas, equipment, and knowledge." In an elementary school, it is the goal of our MakerSpace to expose our students to a wide variety of topics to help them explore and inspire curiosity that will lead them to further independent pursuit of knowledge.

The CREATE Format

The CREATE acronym for course work was developed through research into how other school districts have implemented MakerSpaces into their schools. In our research, we found that MakerSpaces are used a variety of different ways with different emphasis placed on different topics. Through a comparison of MakerSpace ideas and our existing Science Curriculum, we identified 6 areas of opportunity for MakerSpace curriculum to provide unique opportunities to our students either not otherwise covered in our core curricular areas or that could use additional exploration opportunities.

C	**Coding**
R	**Robotics**
E	**Engineering**
A	**Art**
T	**Technology**
E	**Energy**

The goal of the CREATE curriculum would be to provide each student in the Primary School approximately 6 weeks of instruction in each letter of the acronym. It is the case that many of the letters of the acronym overlap such that we would be covering multiple letters within the same project timelines. However, the approach ensures that students are part of a variety of experiences each year of their Primary School.

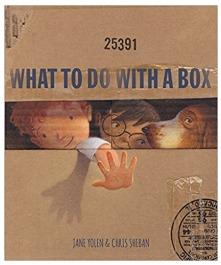
Kindergarten

	Curricular Ideas	Outcomes and/or Standards
C Coding	PLTW - Animals & Algorithms	• Introduce how humans control technology • Learn sequential nature of programming • Design and create an animation about an animal in a habitat
R Robotics	Code-a-pillars	• Student learn what makes something a "robot" • Students learn to control their robot using coded pieces • Students work with a partner & persevere through robot challenges.
E Engineering	GoldieBlox Project Kick-Off Parade Float Building (Designing things that roll - PLTW Connection)	• Students are introduced to a design problem through GoldieBlox • Students work through the design process to sketch, build, and share their final design
A Art	Paint Brush Design Challenge - PLTW	• Students are presented with a design challenge of designing a paint brush • Students work to create paint brushes that meet a variety of different provided challenges while working through the design process.
T Technology	Google Suite	• Students will utilize various aspects of the google suite to complete the other listed projects • Students will learn to utilize google drawings to design digitally and document final results through pictures.
E Energy/Electricity	Static Electricity Experiments • Static Flyer • Static Activities	• Students are introduced to electrical charges and how they work • Students complete various challenges/stations that help them explore static electricity • Students use knowledge of static electricity to create a project that uses static.

First Grade

	Curricular Ideas	Outcomes and/or Standards
C Coding	PLTW - Animated Storytelling	• Combining fundamental principles of computer science with story-building skills, students develop animations that showcase characters, settings, actions, and events from short stories of their own creation.
R Robotics	Robot Mice Mazes	• Students learn to program robotic mice using simply button commands. • Students utilize measurement to design a maze their mouse can navigate • Students partner to construct physical robotic mouse mazes.
E Engineering	The Bot that Scott Built - Robot Design Project.	• Students learn the engineering design process in designing their own robots • Students work on identifying a problem that their robots are designed to solve.
A Art	Planetopia Plant Design	• Students use knowledge from their study of plants to identify key attributes that plants need to have • Students design and construct fictitious plants with required pieces and imagination in between.
T Technology	QR Code Interactive Art	• Students create artwork that has multiple textures, patterns, and parts • Students record audio about their artwork piece and connect their recording to a QR code • Students print and add their QR code to their artwork as a recorded curation. • Artwork is displayed in an interactive art exhibit.
E Energy/Electricity	Squishy Circuit Challenges	• Students investigate conductive and insulating dough in an effort to make electrical pieces work. • Students learn to draw circuit diagrams

Second Grade

	Curricular Ideas	Outcomes and/or Standards
C Coding	PLTW - Grids and Games	• Apply addition and subtraction strategies to make a character move on a grid • Design and develop a video game
R Robotics	Ozobots	• Students use the Ozobots to complete line challenges • Students utilize measurement to create courses for their ozobots to follow based on a given set of criteria and constraints.
E Engineering	What To Do With a Box 	• Students are given the criteria of creating a project with a single cardboard box • Students work to plan necessary pieces to complete their project • Students construct projects using Makedo construction kits to build their projects and utilize “tools”
A Art	Hexbug Drawbots	• Students learn about technology as a means to create artwork • Students design and construct a hexbug powered art device. • Students go through the redesign process to see how one piece of technology can be utilized in various ways to create different products.
T Technology	Google Slides Flipbook Creation	• Students author their own story to be turned into a flipbook • Students learn features of google slides that will allow them to create their flipbooks • Students use screen recording technology to pair them reading their story with their flipbook animation.
E Energy/Electricity	Alternative Energy - Hydro & Wind Power	• Students learn about alternative energy options such as Hydro and Wind power. • Students utilize alternative energy options to complete an initial design challenge of lifting an object to a location.

Third Grade

	Curricular Ideas	Outcomes and/or Standards
C Coding	PLTW - Programming Patterns	• Students think computationally about a problem and use block based code to solve it • Create a tablet based game using modular function and branching logic
R Robotics	Lego WeDo Robotics	• Introduction to Lego WeDo robotic possibilities • Discussion of robotic motors and mechanizing • Students design and program custom lego built robots based on independent designs.
E Engineering	Cardboard Arcade	• Students take inspiration from children engineers that went before them (Caine's Arcade) • Students research arcade games and plan their projects • Students construct arcade games • Students run a cardboard arcade (maybe as a "PBIS" celebration?)
A Art **T** Technology	Stop Motion Animation Projects	• Students design and build sets for stop motion animation projects • Students create stop motion animation videos using one of several methods • Students share their stop motion videos in a film festival.
E Energy/Electricity	Snap Circuits Arcade	• Students use snap circuits to learn how electrical components function together • Students modify their arcade games to include electronic elements (LED lights).

Fourth Grade

	Curricular Ideas	Outcomes and/or Standards
C Coding	Lego WeDo Robotics	• Continuation of WeDo robotics • Discussion of robotic sensors function & purpose • Students design and program custom lego built robots based on selected design challenges they hope to meet.
R Robotics	Vex Ball Machines	• Students utilize directions to follow the construction of a ball machine from beginning to functioning • Students learn to identify the mechanical pieces (gears, pulleys, cranks, etc) at work within their ball machine to make them function without human interaction.
E Engineering	Chain Reaction Projects Rube Goldberg Machines	• Students are initially introduced to the idea of chain reaction using kits and provided challenges • Students self identify a challenge that they would like to complete • Students work on designing for
A Art	Kinetic Sculptures	• Students use their knowledge of kinetic energy from science, and what they have learned through their other makerspace challenges, and apply it in an artistic manner • Students create kinetic (moving) sculptures using a variety of materials • Students test and redesign their projects when needed.
T Technology	Take Apart Tech	• Students access real tools to dig into old technology and see what is inside • Through the process students learn about electronic components and their function within the machines
E Energy/Electricity	Solar Energy	• Students learn how solar panels work to convert energy from the sun into usable electricity • Students utilize solar energy panels and motors to create vehicles powered by the sun.