HOLLISTON Public Schools

Unit 1: STEM/Makerspace Learning PBL Skills

Subject Area: STE	**Course**: Miller Makes & Innovates		
Unit Title: STEM/Makerspace Learning PBL Skills	**Grade(s)**: 5	**Start**: August	**End**: December

Unit Summary: Mrs. Curley and Mrs. Hastings have reimagined and redesigned a fluid, year-long Project-Based Learning class called Miller Makes and Innovates. In this co-taught environment, students learn in a skills-based approach throughout the first semester and then apply their knowledge to an innovative project of their choice during the second semester.

With guidance, they discover their personal passions and the impact they have on the community. Fifth grade students are able to utilize both the Makerspace and Innovation lab, as needed, throughout their project duration.

In this Unit, students will be introduced to a variety of tools that will help them to connect, create, collaborate and think critically about their project design and implementation.

Stage 1: Desired Results

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Massachusetts Learning Standards

- 3.3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.*
- 4.3-5-ETS1-3. Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.*
- 5.3-5-ETS3-1(MA). Use informational text to provide examples of improvements to existing technologies (innovations) and the development of new technologies (inventions). Recognize that technology is any modification of the natural or designed world done to fulfill human needs or wants.

Transfer (Authentic, relevant application of learning to new situations)

Students will be able to independently use their learning to…

- gain a deeper understanding of 3D printing using Tinkercad
- explore Lego WeDo 2.0 a robot-based learning system that incorporates building along with basic coding principles
- identify various Little Bits and learn about circuitry and electronics
- discover everyday objects that are conductive to electricity and can be used with a Makey Makey

Meaning

Enduring Understandings	Essential Questions
Students will understand that… • There are many different tools that can be used for creation, collaboration, creativity and critical thinking	**Students will consider…** • How can we use technology to solve real-world problems and improve people's lives? • How can we use technology to connect, communicate, and collaborate effectively?

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Acquisition	
Knowledge	**Skills**
Students will know… ● Tinkercad is a web-based 3D modeling and design program that allows students to create 3D printable objects and explore design concepts. ● Lego WeDo is a robotics kit that consists of LEGO bricks, motors, sensors, and a coding platform ● LittleBits are electronic building blocks that allows users to create and invent with various circuits. ● Makey Makey is an invention kit that allows users to turn everyday objects into touchpads and connect them to a computer.	**Students will be skilled at…** ● Using Tinkercad to create and manipulate basic shapes, combine them to form complex objects, and refine the details of their designs. ● Planning and building physical models using LEGO bricks, motors, and sensors. While also be able to create basic code to connect with the LEGO robots. ● Understanding basic components such as power, inputs (sensors), outputs (lights, motors, speakers), and how to connect them to create functioning circuits using LittleBits. ● Troubleshooting as they may encounter issues with connectivity, coding, or circuitry, and need to analyze and diagnose the problems to find solutions when using Makey Makey or any of the new resources that are introduced during this unit.