

York Region District School Board
Proposal for submission – Approved Vendor
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Introduction:

STEM MINDS™ is in the business of providing a STEM (Science, Technology, Engineering, Math) based learning experience to children with varying abilities between the ages of 6-14.

The programs listed below can be delivered in the form of:

- Workshops
- Clubs, Lunch programs, After school programs
- Camps

The content can be adjusted to the goals and objectives of the school.

Program Descriptions:

1. 3D Design and Printing

Program overview:

In this program, students will learn about 3D printing, become familiar with different types of printers, and learn how this type of printing is reshaping our future. We'll follow the same process an industrial designer goes through to create a product – by taking an idea on paper, turning it into a 3D model on the computer by using the software: Autodesk®TinkerCAD® and then bringing it to life with a 3D printer.

Applicable Grades:

- Grades 3-8

Learning Outcomes and Objective(s):

Students will:

1. learn to create and be able to use CAD (computer-aided design)
2. learn how to use Autodesk®TinkerCAD®
3. learn how to operate a 3D printer
4. become familiar with engineering and design processes
5. learn about industrial design

2. Robotics

Program overview:

In this program, students will design, build and program LEGO® EV3 MINDSTORM® which is the most advanced and newest robotics technology. Students work as a team to complete projects and missions for EV3 MINDSTORMS®. Advanced Students will work with Robot C®. These are today's go-to robotics system for hobbyists and features improved digital sensors, a seven-state color-light sensor, new gyro sensors, touch sensors and an improved ultrasonic sensor.

Applicable Grades:

- Grades 3-8

Learning Outcomes and Objective(s):

Students will:

- learn how to build advanced robotics with the LEGO® EV3 MINDSTORMS® kit
- learn how to program a robot using the LEGO® EV3 MINDSTORMS® Environment
- learn how to program using color, gyroscope, ultrasonic and touch sensors
- remotely control a robot using Bluetooth®
- learn about core values and essential skills for winning robot competitions
- collaborate and work together on project-based teams

3. Virtual Reality

Program overview:

In this program, students will learn about the concepts of 3D Scanning and viewing objects or virtual views using 3D goggle. Students learn the design process of creating digital media and then viewing it using 3D goggles for a personalized experience.

Applicable Grades:

- Grades 3-8

Learning Outcomes and Objective(s):

Students will:

- learn about 3D Scanning concepts using Skanect
- learn to convert 3D scans into virtual reality video clips using Sketchfab website
- create a personalized video clip and watch it in 3D

4. **Wearable Technology**

Program overview:

In this program, students will learn how design and technology intersect. Students learn the engineering design process to create their personalized pieces of wearable technology, using new skills in programming and circuitry.

Applicable Grades:

- Grades 3-8

Learning Outcomes and Objective(s):

Students will:

1. learn about the engineering design process
2. be given an introduction to Arduino™ programming language & interface
3. be given an introduction to circuits for wearable tech
4. create a hands-on wearable technology project using electronic components and programming.

5. Board Game design

Program overview:

In this programs students will learn the process of designing and building Board games. Sample games will be used to facilitate the discussions so students can create their own version and idea of a Board Game.

Applicable Grades:

- Grades 1-8

Learning Outcomes and Objective(s):

Students will:

1. learn how to think about strategy games, chance games and other ideas

6. 2D Design and Cutting

Program overview:

In this program, students will learn about 2D design, become familiar with different types of CNC Mills and Laser cutters printers, and learn how this type of equipment is reshaping our future. We'll follow the same process an industrial designer goes through to create a product – by taking an idea on paper, turning it into a 2D model on the computer by using the software: Autodesk®TinkerCAD® and then bringing it to life with a CNC Mill or a Laser cutter.

Applicable Grades:

- Grades 3-8

Learning Outcomes and Objective(s):

Students will:

1. learn to create and be able to use CAD (computer-aided design)

2. learn how to use Autodesk®TinkerCAD®
3. learn how to tabletop CNC Mill
4. become familiar with engineering and design processes
5. learn about industrial design

7. Arduino Programming

Program overview:

Learn how to program electronics and use the Arduino™ microcontroller to control real-world objects. You'll learn how to tinker with, build and create gadgets of your own. Use the engineering design process (i.e., create, test and improve) to break down a problem, design a solution and finally build it.

Applicable Grades:

- Grades 5 - 8

Learning Outcomes and Objective(s):

Students will:

1. Learn Object-oriented programming with Arduino™
2. Learn using processing and wiring to program Arduino™
3. Learn how to program algorithms
4. Learn using an Arduino™ for electronics prototyping
5. Learn Software/Hardware: Arduino™ and Arduino™ microcontrollers

7. App Development and Design

Program overview:

Discover how to create video games and character animations using various open source tools. Go beyond drag-and-drop programming and move to Processing, which is a simple, straightforward programming language that introduces you to Java™ — the world's most used computer programming language.

Applicable Grades:

- Grades 5-8

Learning Outcomes and Objective(s):

Students will:

1. Learn the basics of computer programming
2. Learn how to use programming languages and Processing
3. Learn programming concepts such as functions, variables, strings and objects.
4. Learn how to program video games & animations

8. **Hackeronics**

Program overview:

In this program we will open up old electronics and salvage parts to make new things! We will learn how machines are made – whether it be printers, fax machines, and many other electronics.

Applicable Grades:

- Grades 5-8

Learning Outcomes and Objective(s):

Students will:

1. Learn how electronic equipment is constructed i.e type of parts and components
2. Learn to use tools like screw drivers to open up electronics
3. Make new things if they can with salvaged parts

9. Electronics Making

Program overview:

Bring gadgets to life with electrical engineering and software code! Use the circuits, sensors and motors inside of a gadget to make it complete an incredible range of tasks. Learn how to program electronics and use the Arduino™ microcontroller to control real-world objects. You'll learn how to tinker with, build and create gadgets of your own. Use the engineering design process (i.e., create, test and improve) to break down a problem, design a solution and finally build it.

Applicable Grades:

- Grades 5-8

Learning Outcomes and Objective(s):

Students will:

1. Learn the concepts of electrical engineering
2. Learn how to program, design circuits and hack electronics
3. Learn how to use motors, sensors, controllers and displays to control gadgets

10. MakerScience in the Class Room

Program overview:

In this program, students will be introduced to STEM (science, technology, engineering, maths) and foster their creativity while building and innovating new designs. This rich hands-on experience provides students the opportunity to learn in a fun and creative way. The program can be delivered as a “in class” activity with support of teachers or as a “lunch club” / “after school club”. The projects can be modified to fit an hour long class or an hour and a half.

Applicable Grades:

- JK/SK-grade 8

Learning Outcomes and Objective(s):

Students will:

1. Build their fine motor skills
2. Learn about many aspects of science, technology, engineering, math through hands-on projects.

Sample projects include:

Project	Science	Technology	Engineering	Math
Gravity Force Car	x		x	x
Doodle Bot	x		x	x
Motorized Car	x		x	x
Motorized Boat	x		x	x
Flash Light	x		x	x
Light Jars	x		x	x
Lighted Character	x		x	x
Lighted Car	x		x	x
Bridge structure 1	x		x	x
Bridge structure 2	x		x	x
Lighted Card	x		x	x
Home made speaker	x		x	x
Electronics Stadium	x		x	x
Hand stability game	x		x	x
Wave machine	x		x	x
USB Fan	x		x	x
Door alarm	x		x	x
Pop can Fan	x		x	x
Electronic quiz	x		x	x

Project	Science	Technology	Engineering	Math
Gravity balance	x		x	x
Bird House build	x		x	x
Catapult	x		x	x
Lemon Battery	x		x	x
Sensational speakers	x		x	x
Balloon Rocket Car	x		x	x
Dice Build	x		x	x
Gliding Vibrobots	x		x	x
Kaleidoscope	x		x	x
Dancing Snake	x		x	x
Fantastic Fossils	x		x	x
Flying potatoes	x		x	x
Wind Mill	x		x	x
Parachutes	x		x	x
Weather Vane	x		x	x
Wind Catcher	x		x	x
Mask making	x		x	x
Floating animals	x		x	x
Surveyor's Map	x		x	x
Brush Bot	x		x	x
Critter	x		x	x
Lighthouse	x		x	x
Inflatable Robot	x		x	x
Soda Can Fan	x		x	x
Popsicle stick project	x		x	x
Cipher Wheel	x		x	x
Actuated Paper	x		x	x

Project	Science	Technology	Engineering	Math
Soda Can Fan	x		x	x
Robotic Arm	x		x	x
Make a game	x		x	x
Straw structure	x		x	x
Tensegrity Robot	x		x	x
House of Cards	x		x	x
Drum Set	x		x	x
Magnetic toy	x		x	x
Ferris Wheel	x		x	x
Duck Boat	x		x	x
Magic Wand	x		x	x
Hovercraft	x		x	x
Wind Turbine	x		x	x
Bucket Tower	x		x	x
Fiber Bot	x		x	x
Paper roller coaster	x		x	x
Seismograph	x		x	x
Paper Spinners	x		x	x
Battery from pennies	x		x	x
Rubber band racer	x		x	x
Paper roller coaster	x		x	x
Shelf for the Elf	x		x	x
Toy from trash	x		x	x
Circuit with foil	x		x	x
Water clock	x		x	x
Pasta Sculpture	x		x	x
Conveyor belt	x		x	x

Project	Science	Technology	Engineering	Math
BugBot	x		x	x
Cable Car	x		x	x
Sun Catcher	x		x	x
Propellor car	x		x	x
Light and Pins	x		x	x
Straw structure	x		x	x