# Discovery
# ROBOTICS

## AGES 7

# EXCEED DISCOVERY ROBOTICS



7 yo. start here
8 yo. start here

**1 : Introduction to Roborics & Coding**

**2 : Advanced Programmimg Skills**

**3 : Computer Design, 3D Printing & Electronics**

## The Ultimate STEM Robotics Program for Inquisitive Minds

The Discovery Robotics curriculum focuses on teaching our youngest students **Programming, Computer Design-3D Printing and Electronic Circuits** in a hands-on, step-by-step approach.

All Robotics courses follow a structured curriculum with daily challenges designed to promote critical thinking and experiential learning. The curriculum starts with teaching programming using IPADs then graduates onto using computers. New robots are introduced in every course to keep students engaged and excited to learn important STEM skills. The end goal of the program is to build confidence in our young students and have fun learning!

## PROGRAM DETAILS

1-month curriculum

Classes once per week classes

One-hour in duration

6 students max per class

*he Discovery Robotics curriculum was created by a team of mechatronics engineers with 25+ years of global industry experience with the aim of advancing STEM education amongst Canada's youth. The Discovery Robotics program's vision is to introduce programming, mechanical design, and electronics to young students through real-world applications and a step-by-step approach.*
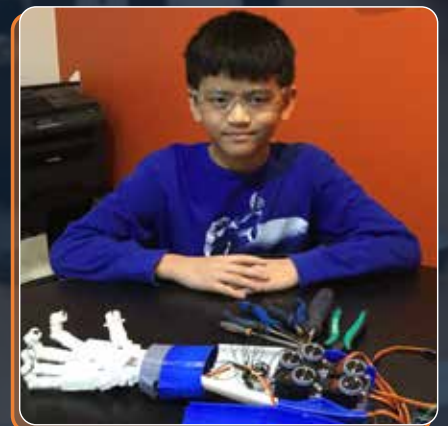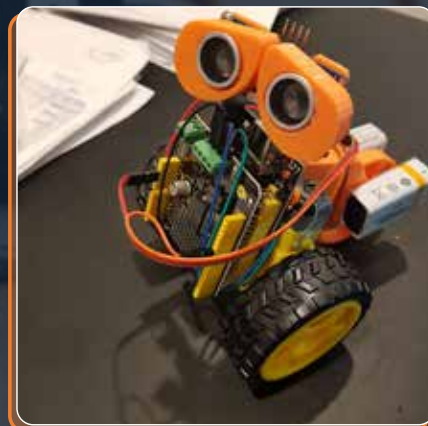


## Alumni Robotics (ages 11+) Projects

EXCEED
R O B O T I C S

### DISCOVERY 1: ECO-QUEST

Prerequisite: ages 7+ (no experience required)

The first robotics course in the Discovery Robotics curriculum involves students building their own programmable Lego robots each class and using their IPAD to code.
Every class begins with the introduction of a particular concept followed by students assembling, programming and conducting experiments. For example, to teach the concept of speed vs. wheel size, students build, program and time their race car when attaching large wheels and small wheels.



### DISCOVERY 2: MECH-TREK

Prerequisite: Discovery 1

The first robotics course in the Exceed Robotics curriculum focuses on building programming logic using robots.
Sequential programming and conditional statements are introduced to program a robot to perform specific tasks, utilizing various sensors to make decisions.
STEM topics are integrated into each lesson by presenting the science behind a specific sensor or applying math for motor drive and control



### DISCOVERY 3: LOGIC JUNGLE

Prerequisite: Discovery 2

The first robotics course in the Exceed Robotics curriculum focuses on building programming logic using robots.
Sequential programming and conditional statements are introduced to program a robot to perform specific tasks, utilizing various sensors to make decisions.
STEM topics are integrated into each lesson by presenting the science behind a specific sensor or applying math for motor drive and control

**EXCEED**
R O B O T I C S

### DISCOVERY 4: ROBO-GAMES

Prerequisite: Discovery 3

Students continue to build their programming skills, this time transitioning away from IPADs and starting to use computers. An advanced Lego robotics platform allows students to start learning robotics at a higher level. Various Olympic-style challenges are designed to teach students how to use more complex sensors which assist detecting different conditions when competing in our Robo-Games.



### DISCOVERY 5: SUMOBOT CHALLENGE

Prerequisite: Discovery 4

A fun application course designed for students to practice and apply their knowledge from previous courses.
Sumo robots containing various motors and sensors are programmed to push the opposing robots out of the sumo ring. Colour sensors will keep an eye on the ring's boundaries while ultrasonic sensors keep an eye on the opposing robot. All students will have a blast throughout this course but only one Sumobot will be left standing,
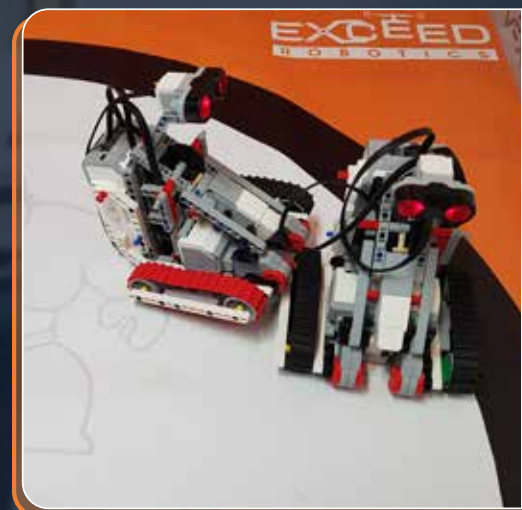


### DISCOVERY 6: ROBO-RESTAURANT

Prerequisite: Discovery 5

I'll have a kale salad with Parmesan and a ginger ale please...
The final course in the Advanced Programming Skills series involves a futuristic application – robots waiting tables in the Robo-Restaurant. Students will work independently to program their bots to bring various dishes from the kitchen to their customers, utilizing various sensors to make decisions based on their customer's order. A fun challenge designed to promote critical thinking through programming the restaurant of the future.

## DISCOVERY 7: COMPUTER DESIGN & 3D PRINTING

Prerequisite: Discovery 6

To first course in the Mechanics series relates to the design of 3Dprinted mechanical parts. Students learn various design tools using Autodesk Fusion 360 to create their own designs.
Starting with sketching, students complete various design projects to practice using design tools and features. Through select projects, students will practice using fundamental tools in mechanical design. Design projects are assigned for students to independently apply their design skills and create functional mechanical components that could be 3D printed.



## DISCOVERY 8: SIMPLE CIRCUITS

Prerequisite: Discovery 7

Building robots cannot be complete without learning how parts we design should fit together. This machine design course teaches students about the fundamentals of machine design including fits and clearances, structure design, levers, gears, and more. Students will design each component of the machine and will assemble them together in the design software. By learning about joints and constraints, students will create a virtual simulation of their creations. In industry, design simulation is an essential tool used by engineers to predict functionality and performance before building a single prototype.
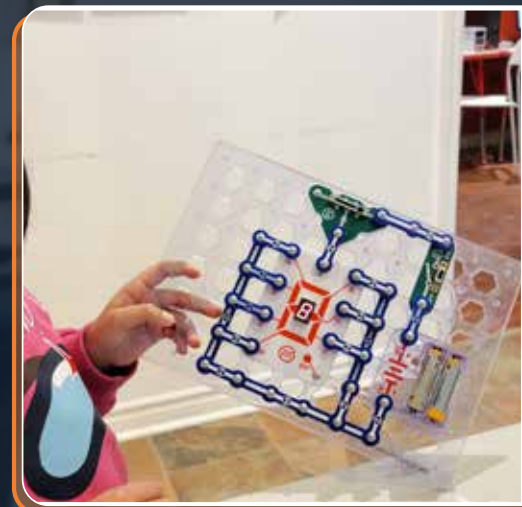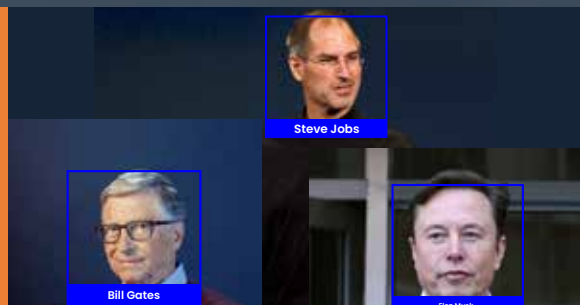
## What's Next?


**ALUMNI WORKSHOP**

*A project-based environment where students apply their learned skills and work on their own creations (products, programs and apps) under the supervision of a workshop manager. Ideal for students who are interested in working on their own ideas and projects.*


**Python & Artificial Intelligence**

*Python & Artificial Intelligence is suitable for students who wish to take their leaning to the next level by joining Python and Artificial Intelligence curriculum where they learn AI applications such as Face Detection or Speech Detection using Raspberry Pi.*