Virtual Camp Descriptions

Contents

Coding Track

Using scratch and micro:bit, students will learn about coding, the engineering design process and data collection. This hybrid offering puts micro:bit in students hands to use as a tool around the house while telling stories in scratch on collecting data with a variety of sensors. After this virtual camp students will be prepared to create projects and continue to engage in STEM.

Scratch Level 1:

Participants learn to code using Scratch, an introductory visual programming language. Working through a series of coding activities, students will develop a fluency in the basic techniques of coding. No prior experience required.

Cost: **$98**

Micro:bit Level 1:

During this camp, students will be introduced to coding through the Micro:bit, a credit-card sized computer. Through exploring the sensors built into the micro:bit, students will create a basic portable personal assistant. Participants must purchase their own micro:bit either through the registration system or through the listed vendors below.

Cost: **$98** (micro:bit at additional cost **$30** each)

Scratch Level 2:

Participants will advance their coding knowledge using Scratch to create a simple 2D video game. The video game will include navigating a character through a virtual environment with user input such as a keyboard. Participants should have completed Scratch Level 1 or a similar program before taking Scratch Level 2.

Cost: **$98**

Micro:bit Level 2:

Participants will advance their coding knowledge using the Mirco:bit to create a handheld interactive video game by manipulating the built in features of the Micro:bit. Participants should have completed Micro:bit Level 1 or a similar program before taking Mirco:bit Level 2. Participants must purchase their own micro:bit either through the registration system or through the listed vendors below.

Cost: **$98** (micro:bit at additional cost **$30** each)

Advanced Scratch Level 3:

This camp extends the coding techniques learned during level 1 and level 2 SySTEMic camps. Students will create simulations using basic artificial intelligence. Participants must have completed a level 1 or level 2 coding camp or have an equivalent level of skill.

Cost: **$98**

<u>Micro:Maqueen Level 3:</u>

The micro:Maqueen is a small mobile robot designed to serve as an introductory platform for competitive robotics. During this camp, participants will assemble, code, and test the Maqueen, extending their programming and computational thinking skills. In order to participate in this camp, students must have completed one of SySTEMic's Micro:bit Level 1 and/or 2 camps or have an equivalent level of skill. Participants must purchase their own micro:bit and micro:Maqueen either through the registration system or through the listed vendors below.

Cost: **$98** (micro:bit and micro:maqueen at additional cost **$30** each)

<u>Vendors for micro:bit and micro:maqueen</u>

Micro:Bit:
Amazon: https://www.amazon.com/micro-bit-BBC2546862-Micro-go/dp/B01G8X7VM2/ref=sr_1_2?dchild=1&keywords=microbit+go&qid=1588981271&sr=8-2

Sparkfun: https://www.sparkfun.com/products/14336

Adafruit: https://www.adafruit.com/product/3362

MicroMaqueen:
DF Robot: https://www.dfrobot.com/product-1783.html (without micro:bit)

VEX Robotics Track

In the VEX IQ Challenge camp, students will learn how to analyze, create an engineering notebook, and code in blocks utilizing a virtual robot and online programming software. In the VEX Robotics Competition Camp students will learn how to approach the yearly challenge through the engineering design process. Students will learn to code in VEX Code text and work on CAD assembly to prototype their robot. These skills will prepare students for yearly competitions.

<u>VEX IQ Challenge Camp</u>

Participants will utilize the engineering process to conceptualize a design of their own VEX IQ robot and document it in an engineering notebook. Students will learn about different drive trains, lift and intake systems/mechanisms, and mechanical advantages using gear ratios. They will be programming a virtual robot in VEXcode VR and learn about different coding techniques such as loops and functions. They will also be discussing game strategy for the new (2021-2022) VEX IQ Challenge game.

Cost: **$196**

<u>VEX Robotics Competition Camp</u>

Participants will utilize the engineering process to conceptualize a design of their own VEX robot and document it in an engineering notebook. Students will learn about different drive trains, lift and intake systems/mechanisms, and mechanical advantages using gear ratios. They will be programming a virtual

robot in VEXcode VR and learn about different coding techniques. Students will be discussing game strategy for the new (2021-2022) VEX Robotics Competition game.

Cost: **$196**

Cybersecurity Track

High school students interested in exploring the Cybersecurity domains and furthering their knowledge of human security, computer hacking, digital safeguarding of applications, and secure communication will find much to learn through this track. Five camps will be offered, providing students the opportunity to select the topic(s) that meet their interests. Each camp will feature activities and labs to engage students, including labs offered by the Virginia Cyber Range.

Common for all cybersecurity camps are a requirement for PC or laptop computer (no tablets or iPads). Webcam is helpful but not required. Students will need to sign up for a Virginia Cyber Range account prior to camp. A Google, Microsoft, or Facebook account will be needed to authenticate the student account. Information on the sign-up process will be sent closer to the start of camp.

Introduction to Cybersecurity

This camp will introduce students to the foundations of cybersecurity, including but not limited to personal and home security, network security, cyber law, and encryption. Students will be introduced to virtual machines and the Linux command line. Online activities and labs will engage students throughout the week. Students with prior cyber camp or classroom experience will be better served through our other cyber camps.

Cost: **$98**

A Deeper Dive: Hacking & Forensics

This camp will explore penetration testing and digital forensics to conduct examinations of computer systems. A variety of online labs and resources will provide students hands-on experience exploring these important cyber controls to ensure secure environments. **Previous experience with cyber concepts and the Linux command line is required.**

Cost: **$98**

A Deeper Dive: Encryption & Cryptography

This camp will explore the world of cyber defense and cryptography using puzzles and labs to learn about cipher techniques and what makes for strong encryption. **Previous experience with cyber concepts and the Linux command line is required.**

Cost: **$98**

A Deeper Dive: Network Security

This camp will explore the fundamentals of networks and network security using UNIX/Linux and Windows environments. Online labs and activities will provide students hands-on experience in examining network

traffic and using network security tools. **Previous experience with cyber concepts and the Linux command line is required.**

Cost: **$98**

Dare to be Challenged: Capture the Flag

This camp will explore the world of Capture the Flag. Students will be challenged during the week with CTF competitions and assessments. **Experience using the Linux command line is required.**

Cost: **$98**

Fabrication Track

Students will utilize free software to engage in a variety of camp offerings that allow students to design and make their products utilizing 3D printers, laser engravers and CNC machines in a makerspace. These hybrid camps are intended to engage students in the design process. Students will be mailed a starter kit to create a project of their finished product.

Level 1 camps provide an opportunity for participants to explore a variety of ways of designing and making items and learning about related technology. These camps provide an introduction and background skills for the more specific Level 2 Fabrication camps. Level 2 camps provide a more immersive exploration of a *specific* maker process from design to fabrication. They build upon skills developed in the Level 1 camp and allow the participant to choose an area(s) of interest that was sparked during that previous session. Completion of a Level 1 camp is required before participating in a Level 2.

Fabrication Junior camps are for rising 4th to 7th grade students while the Fabrication Senior camps are for student in rising 8th to 12th grade. Students need a PC or laptop computer (not a phone or tablet) with a webcam and ideally a mouse in order to participate.

Fabrication Junior - Level 1

This camp is for rising 4th –7th graders that want to explore various ways to design and make items. This introduction to fabrication involves using design software, completing hands-on challenges and learning about fabrication tools such as 3D printers, laser cutters, and CNC routers. Students will be designing items that will be produced in the NOVA Fab Lab and shipped to them after the camp. In addition, participants will receive a STEM materials kit before the camp starts.

Sample Activities:
- Create an LED Emoji with fabric, circuitry and a switch.
- Design a personalized whistle for 3D Printing.
- Design a custom ink stamp for CNC routing.
- Design a keychain or backpack tag for laser cutting

Cost: **$148** (materials & shipping included)

Fabrication Senior - Level 1

This camp is for rising 8th –12th graders that want to explore various ways to design and make items. This introduction to fabrication involves using design software, completing hands-on challenges and learning about fabrication tools such as 3D printers, laser cutters, and CNC routers. Students will be designing items that will be produced in the NOVA Fab Lab and shipped to them after the camp. In addition, participants will receive a STEM materials kit before the camp starts.

Sample Activities:
- Design a solar car frame for 3D printing and then build and test the car.
- Design personalized coasters for laser cutting.
- Create an LED Emoji with fabric, circuitry, and a switch.
- Design a custom ink stamp for CNC routing.

Cost: **$163** (materials & shipping included)

Fabrication Junior - Level 2: 3D Printing

Participants will further their design skills by creating their own 3D project. More advanced skills in CAD design and the engineering design process will be covered. Their final design will be 3D printed by the NOVA Fab Lab and mailed to the participant. For 4th-7th graders and completion of a Level 1 Fabrication camp prior to this session is required.

Cost: **$123** (materials & shipping included)

Fabrication Junior - Level 2: CNC Routing Made Easy

During this camp, students will design a custom maze using free design software called Easel™. The maze will eventually become a sealed and self-contained puzzle capturing an 1/8" ball bearing that travels through carved corridors. A clear acrylic top and designed bezel will capture the ball bearing, while simple fasteners will hold the unit together. The custom maze will be carved on our portable CNC machine and mailed as a kit for final assembly at home. For 4th-7th graders and completion of a Level 1 Fabrication camp prior to this session is required.

Cost: **$123** (materials & shipping included)

Fabrication Junior - Level 2: Laser Cutting/Engraving

Participants will learn how to design products in Inkscape in preparation to be laser engraved. Inkscape is a free vector-based software program that allows for creation and editing of computer graphics. Students will be able to choose their designs they want laser engraved by the NOVA Fab Lab, and those items will be fabricated and mailed to the participant. For 4th-7th graders and completion of a Level 1 Fabrication camp prior is required.

Sample Activities:
- Create a personalized picture frame insert.
- Create personalized cupcake or wedding cake toppers.
- Create a personalized phone stand.

Cost: **$123** (materials & shipping included)

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Sample Activities:
- Create a personalized jigsaw puzzle.
- Create a custom shaped box (jewelry, etc.) or small storage container.

Cost: **$123** (materials & shipping included)