V5 Workcell & Factory Automation Competition

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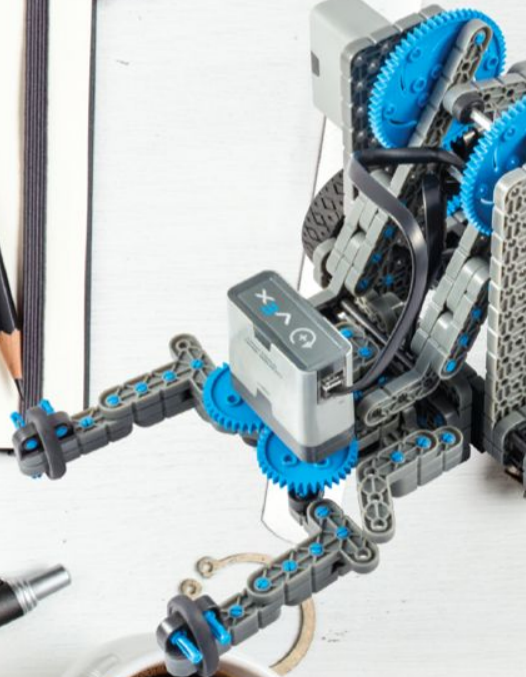
21st Century Workforce

Educating Tomorrow's Innovators

NEARLY 2.5 MILLION STEM JOBS ARE GOING UNFILLED

- The REC Foundation's education programs **provide** a pathway to **STEM** careers

- "VEX Robotics students **earn** manufacturing industry certifications **50% faster** than other students." (RAMTEC, 2018)

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Our Workforce Development Goal

The REC Foundation aims to improve Workforce Development Education and interest by providing a clear path for students to prepare for advanced manufacturing careers, help close manufacturing skills gaps for many employers, and prepare the manufacturing workforce for continual career development.

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Our Program

Factory Automation Competition

The Factory Automation Competition is a classroom-based competition that provides students, from across the world, the opportunity to integrate and recognize how STEM skills translate to the workforce. This unique new manufacturing competition will attract students into robotics manufacturing careers while providing curriculum, resources, and hands-on problem-solving skills.
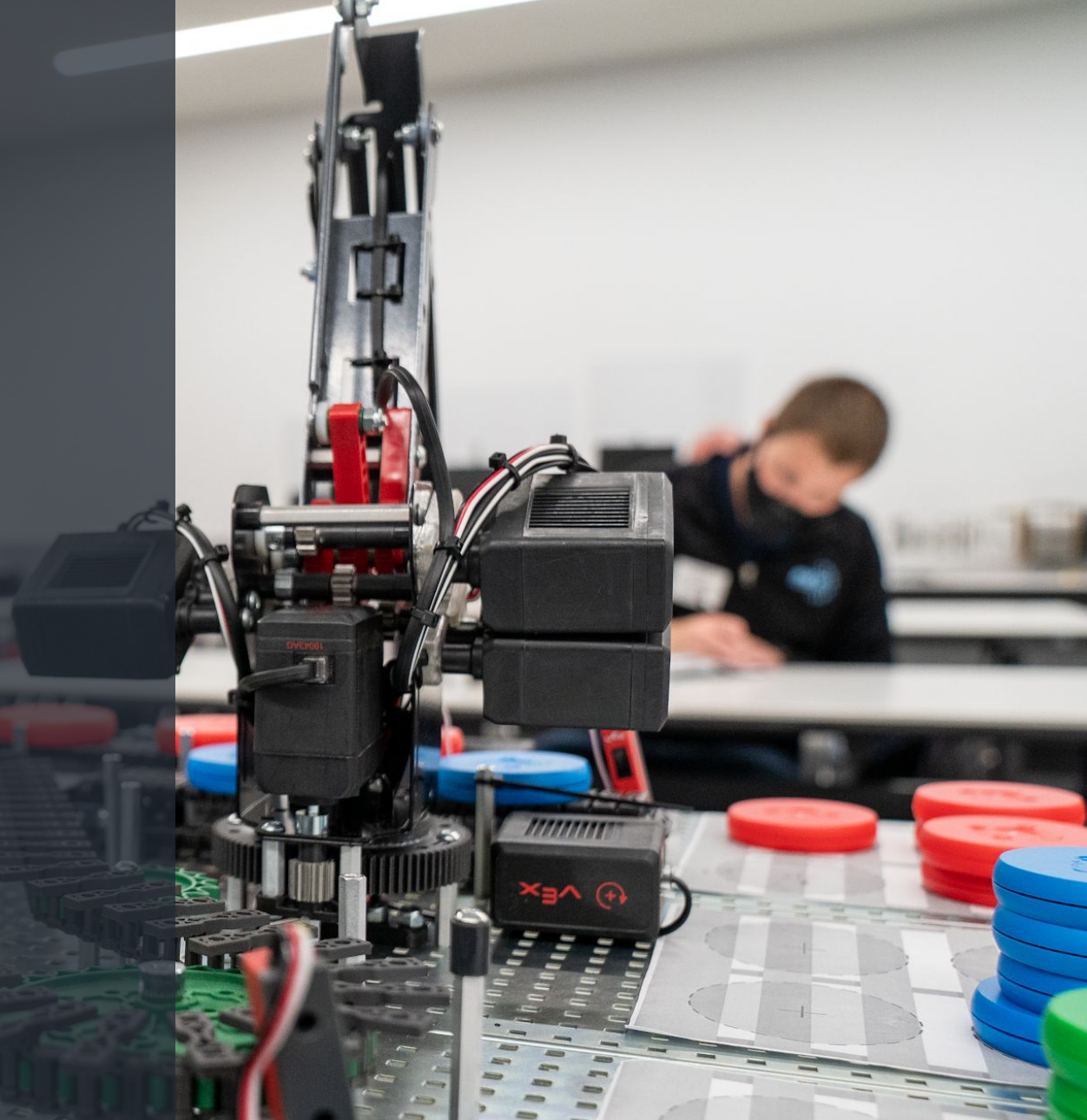
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The Competition

Factory Automation Competition

FAC Teams are presented with various manufacturing challenges with the goal of having the best throughput and run time at different levels of competition or Competition Phases. These phases progress the student's workcell as they design, build, program, and implement the best solutions for each challenge, all while competing on a global scale.

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Competition Phases

Phase 1 & 2

Competition Phase 1
Deliver and sort all Disks by color to the correct Loading Zone.
Loading Zone 1 - All Red Disks
Loading Zone 2 - All Blue Disks
Loading Zone 3 - All Green Disks

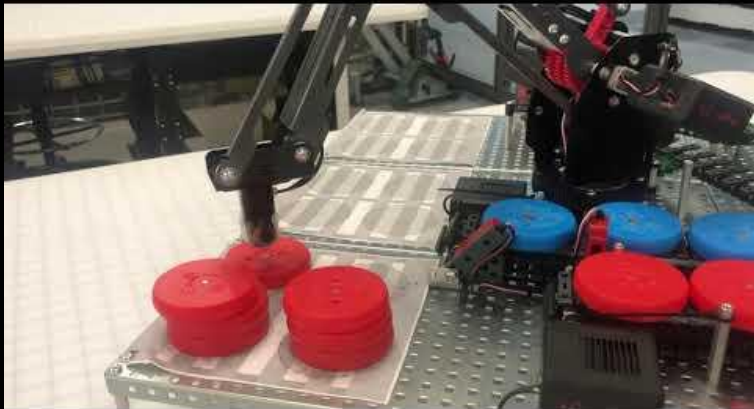| Competition Phase 2 |
|---|
| Deliver and sort all Disks by color to the correct Loading Zone. |
| Loading Zone 1 - All Red Disks |
| Loading Zone 2 - All Blue Disks |
| Loading Zone 3 - All Green Disks |
| Deliver Disks in Stacks of three (3) |

Bridging the Gap

CLASSROOM

INDUSTRY

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Workcell
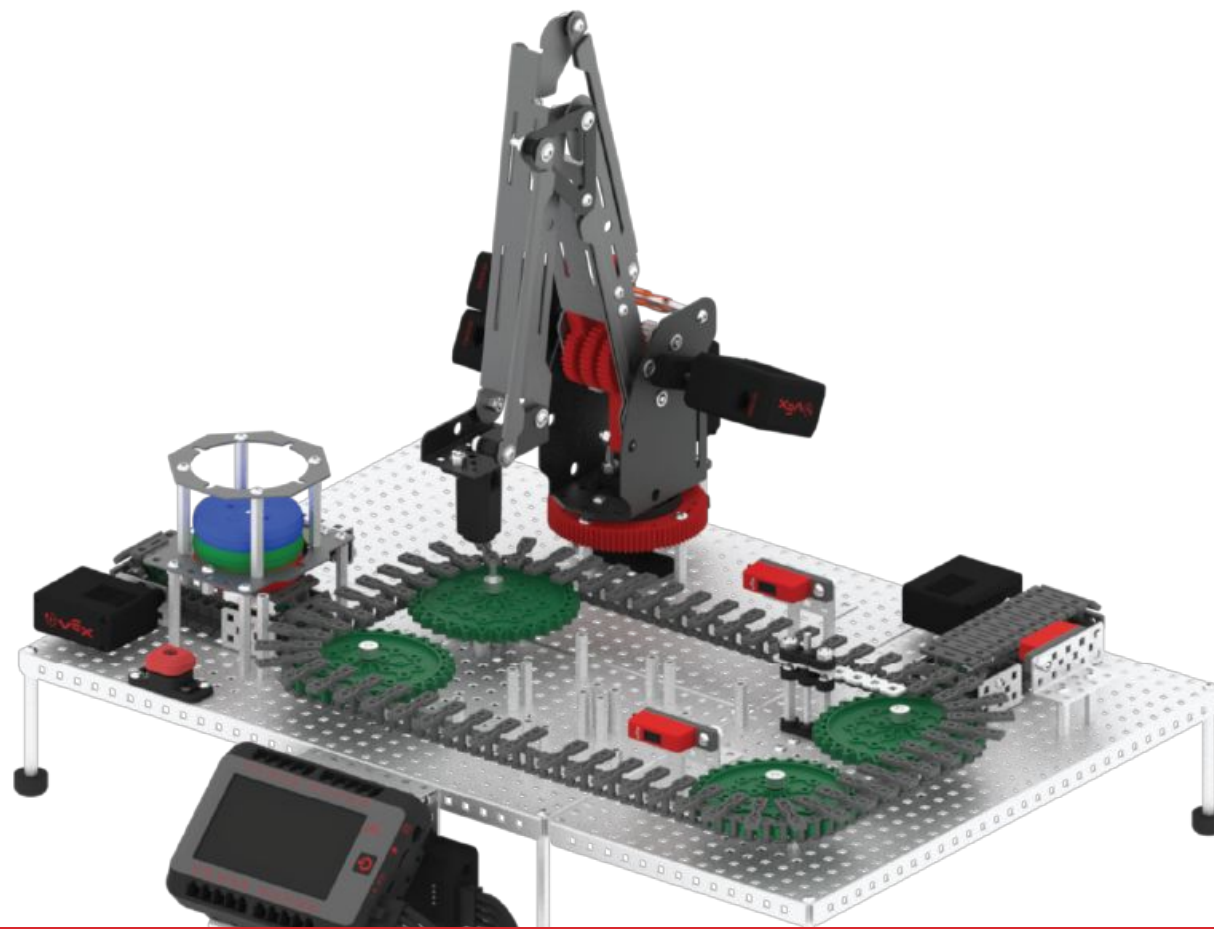
Our educator resources include high-quality instructional materials, professional development, and the VEX Knowledge Base to give you everything you need to become a STEM leader. Our STEM Labs foster engagement within the classroom, providing a complete STEM experience, ensuring workforce development and college preparedness.

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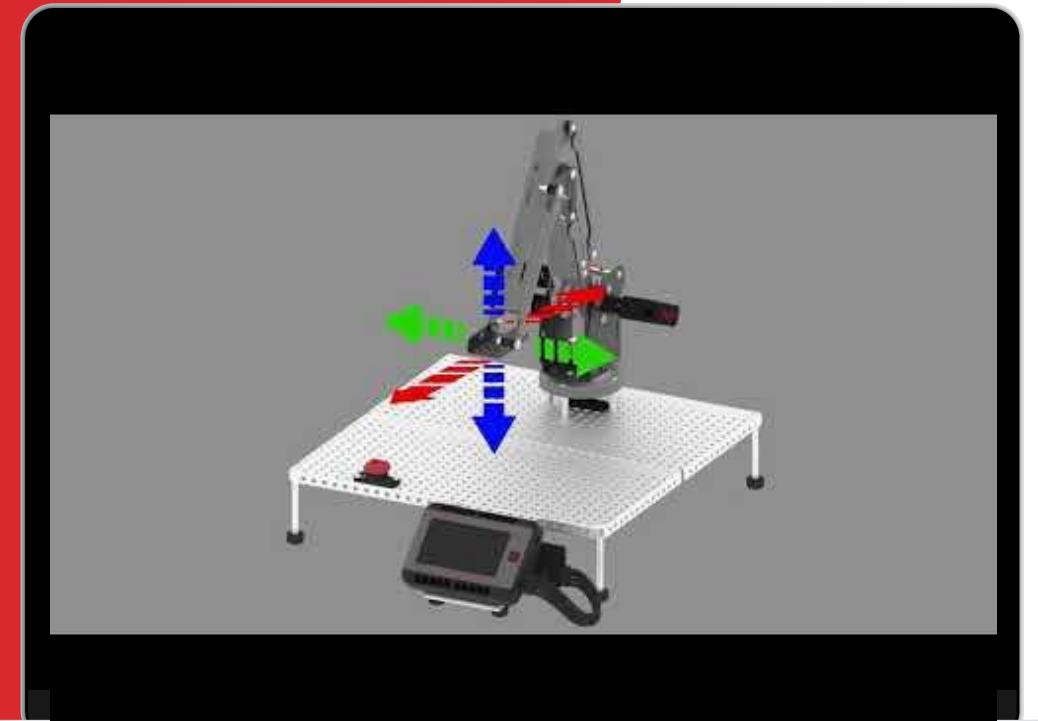
STEM **LAB 1**

Industrial Robotics

- Explain what an industrial robot is.
- Identify that the four main components of an industrial robot are: manipulator, power supply, controller, and teach pendant.
- Describe applications of industrial robotics such as welding, assembly, painting, and sorting.
- Describe the four automation types: Mechanization, Fixed/Hard Automation, Programmable Automation, and Flexible Manufacturing Systems.

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STEM LAB 3

Manual Movements

- Explain why calibration is important in regards to the operation, accuracy, and repeatability of industrial robots.
- Identify the six types of industrial robotic configurations and match the V5 Robotic Arm to the configuration it represents.
- Recognize what factors define the movements of robots.
- Identify different actuators such as hydraulics, pneumatics, and electrical motors.
- Follow a discrete procedure to manually jog the robotic arm.
- Identify and label the different axes addressed during manual jogging and recognize the (x,y,z) coordinates from the V5 Brain after the arm has been moved manually.

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STEM LAB 11

Cooperative Systems

- Explain the process of handshaking with robot to robot communication, and why it is important.
- Adjust the parameters of the Entry Conveyor n order to properly use the Disk Feeder.
- Create a Boolean variable to track the placement of green disks.
- The advantages of a V5 Robotic Arm working in coordination with a conveyor system
- Explain Continuous and Batch Production
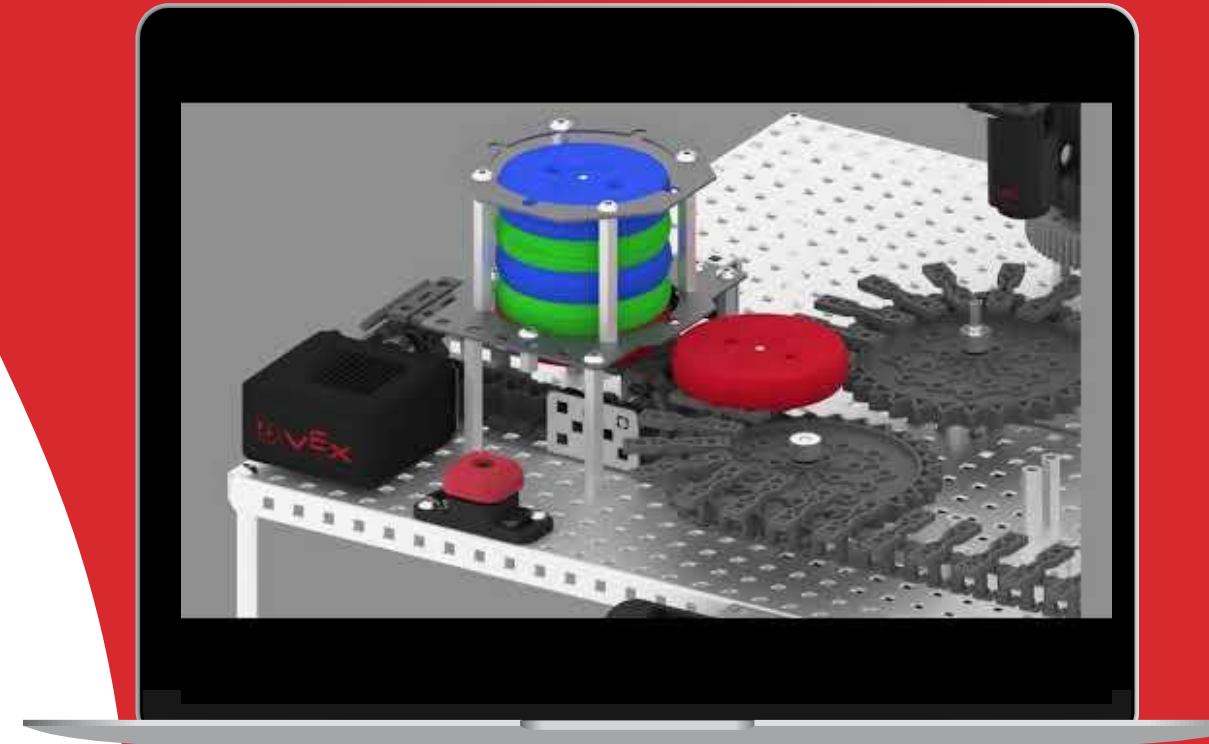
Factory Automation Competition

Benefits

Students learn industry, manufacturing, & workforce development skills

Collaborative project-based learning in industry relevant settings, creates a bigger and stronger workforce pipeline

The FAC Program bridges the gap between classroom and workforce, while fueling Industry 4.0 technology and tomorrow's innovators
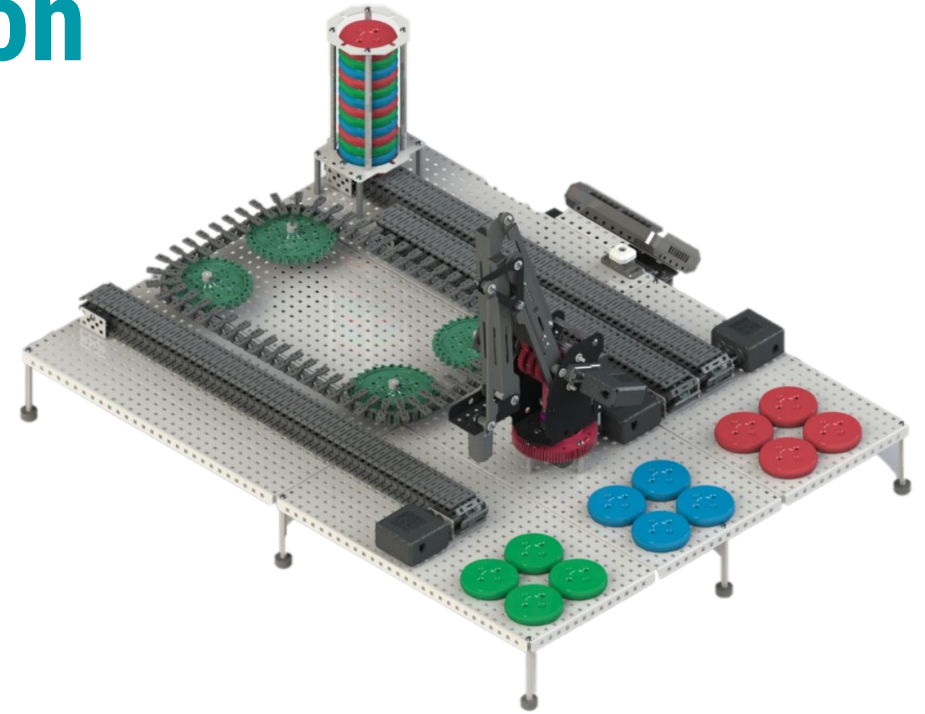
VEX.V5 Workcell

EXPLORE STEM LABS

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THANK YOU

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