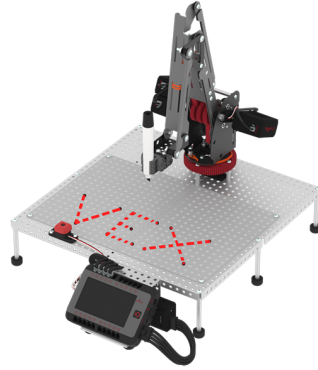


V5 Workcell Preview: Lab 6 - Using an End Effector

Grade(s): 9-12 | Time: 1 week



Description

In Lab 6, students will investigate how adding to the z-value of a coordinate lifts the marker off of the whiteboard on the Workcell. Then, they will explore how to store (x, y, z) coordinates in a 2D list in order to draw two triangles using a dry-erase marker. Students will also be reading about the relationship and value of accuracy and repeatability with industrial robots. Finally, students will be challenged to create a VEXcode V5 project where the arm draws 'VEX' on the whiteboard.

Essential Question(s)

- What are 2D lists and how are they used in programming a robot?

Understanding(s)

Students will understand:

- How to use 2D lists to store values in a VEXcode V5 project.

Objective(s)

- Identify that a 2D list is made up of rows and columns.
- Identify that a 2D list stores multiple sets of numeric values that are related.
- Identify how to create a 2D list in VEXcode V5.
- Identify how to use variables in a VEXcode V5 project.
- Identify how to use a repeat loop in a VEXcode V5 project.
- Identify that an index is used to represent the position in a 2D list in their VEXcode V5 project.
- Identify how to launch VEXcode V5.
- Identify how to open an example project.
- Identify how to name and save a VEXcode V5 project.
- Identify how to download and run a VEXcode V5 project.
- Identify how to add blocks to a VEXcode V5 project.
- Identify that the third number of a coordinate indicates how far the arm will travel from the origin in the z-axis.

Vocabulary

2D List

A block in VEXcode V5 which allows the storage of multiple values in rows and columns. Also known as a 2D array.

Index

A numeric representation of an item's position in a list or other sequence.

End of Arm Tooling (EOAT) / End-Effector

End-Of-Arm-Tooling or an end-effector is the term used for robotic tooling for manipulating parts mounted on the end of the robot arm. Examples are grippers, magnets, welders, paint guns, etc.

Materials Needed

Quantity	Materials Needed
1 per group	V5 Workcell
1 per group	VEXcode V5
1 per group	Engineering Notebook
1 per group	Device to run VEXcode V5
1 per group	Micro-USB cable
2 per group	Dry-Erase Marker (multiple colors)
1 per group	Seek Checklist

Educational Standard(s)

- Next Generation Science Standards (NGSS) HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- International Society for Technology in Education (ISTE) 6b: Students create original works or responsibly repurpose or remix digital resources into new creations.
- Computer Science Teaching Association (CSTA) 3A-AP-14: Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

Go to [this page](#) in the Knowledge Base to see a cumulative list of VEX V5 Workcell STEM Labs standards.