

Introduction

Science, Technology, Engineering and Mathematics (STEM) education provides opportunities for students to engage in important life skills like teamwork, communication, and project-based organization. Robotics is an ideal approach to acquiring these STEM skills as students work together to solve various engineering challenges.

The following VEX STEM Lab provides engaging programming activities for students who have some experience programming robots. Students will employ either VEXcode V5 Blocks, C++, or Python to complete several projects after building the VEX V5 Clawbot.



Please keep this letter for your reference as your student works through the Clawbot with Controller STEM Lab. It contains information that you can use to keep up to date on what students are learning and to spark discussions about STEM and Robotics at home.

Look Inside the STEM Lab

In this lab, students will have the opportunity to build the Clawbot as a team. After recording their reflections of the build in their engineering notebooks, students will learn about how to program the Clawbot for use with the Controller. Students will also discuss the benefits of using robots to assist with repetitive tasks in different industries after being introduced to programming loops. Students will also consider how event based programming is beneficial to competition teams. Students will then explore ways to use the Controller by analyzing the Tank Drive and Clawbot Control example projects, recording their ideas and calculations in their engineering notebook.

Vocabulary

Clawbot

The robot build that is used for the STEM Lab. This robot is the result of the first hands-on lesson the students will accomplish. It is used to complete the rest of the STEM Lab activities.

Events

An action or occurrence detected by a program. Events can be based on user actions, such as a sensor input or detecting a specific color signature.

Loops

One of the three building blocks of an algorithm (Sequence, Selection, Iteration). A Sequence is the action performed by the robot; the Selection is the decision to perform the programmed action; and Iteration is the amount of repetition, or loop, of an action.

Tank Drive

Enables the Controller to control the two motor functions of the Clawbot separately.

Real World Connection

Students will discuss how robots are used in the workplace to complete tasks that are repetitive, like on an assembly line. Students will be introduced to VEX Robotic Competitions and explore how loops are beneficial when creating a competition project.

Guiding at Home Questions

During the STEM lab, the students worked as a team to build a Clawbot that they drove with a controller and programmed themselves. Spark some discussion using these questions.

- What was the best part of building the Clawbot?
- What did you have the Clawbot do when you were moving it with the Controller?
- What was the hardest part of the Robo-Slalom Challenge?

You can explore the STEM Labs at education.vex.com.