9 Week Coding Focus Scope and Sequence

This Scope and Sequence is intended to be a starting point for VEX V5 educators looking to start with a set 9-week scope of STEM Lab Units. This scope will explain how you can use these curricular materials while focusing on coding topics. It is organized by week, so you can print out one page and reference it throughout the week to see what class should be completing each activity.

This Scope and Sequence covers a progression using both V5 STEM Labs, V5 Activities, and EXP STEM Lab Units.

- To learn more about the structure of V5 STEM Labs, view this article.
- To learn more about the structure of EXP STEM Lab Units, view this article.
- For information on how to adapt EXP STEM Lab Units to use with V5 Kits, view this article.
- For more information on V5 Activities, view this article.

A column for the VEX V5 Educator Certification is also listed to show how you can complete portions of the certification while teaching VEX V5 to your students.

All STEM Labs referenced in this scope and sequence will be linked as the Teacher version. The student versions can be found on this page. For more information about implementing V5 STEM Labs, view this section of the VEX Library.

Week 1 - Introduction

Weekly Summary: Students will be introduced to their VEX V5 Kit, build the V5 Speedbot, and be introduced to coding.

VEX V5 Educator Certification: Complete Unit 1: Getting Ready and Unit 2: Basic Movement before class.

STEM Lab Units / Activities	Description
Scavenger Hunt Activity	Use the Interactive Parts Poster to learn more about the VEX V5 Kit and find all the pieces described.
Build the V5 Speedbot	Students will build the VEX V5 Speedbot.
Square Dance Activity	Code the Speedbot to autonomously drive in a square.

Differentiation:

- For students who need additional coding challenges, have them complete the Level Up in the Square Dance Activity.

Week 2 - Medbot

Weekly Summary: Students will explore how to code the Speedbot to drive forward, in reverse, left, and right in the Automed Challenge.

STEM Lab Units / Activities	Description
(V5) Medbot: Play Section	Students will explore how to code the Speedbot to drive forward, in reverse, left, and right.
(V5) Medbot: Rethink Section	Students will code the Speedbot to navigate a hospital as it delivers medications to patients in several different rooms.

Differentiation:

- For students who finish early, have them design a new hospital layout with more rooms and floors. Ask students to plan out how the Speedbot will have to move to drive to each new room in the updated layout. If time permits, have students code the Speedbot to travel through the new hospital layout.

Week 3 - Speedy Delivery

Weekly Summary: Students will build the V5 Clawbot, learn about ranges of motion, and then code the arm and claw in order to stack objects in the Stack Attack Activity.

VEX V5 Educator Certification: Complete Unit 4: Manipulators and the V5 Clawbot before class.

STEM Lab Units / Activities	Description
(V5) Speedy Delivery: Seek Section	Students will build the VEX V5 Clawbot.
(V5) Speedy Delivery: Play Section	Students will learn about ranges of motion in order to code the arm and claw.
Stack Attack Activity	Code the arm and claw to stack objects.

Differentiation:

- Have students complete the Lock Tight Challenge in the Play section with various sized objects in order to test different degree measures of opening and closing the claw.
- Have students complete the ‘Level Up’ section of the Stack Attack Activity.

Week 4 - Package Dash Challenge

Weekly Summary: Students will code the Clawbot to participate in the Package Dash Challenge.

STEM Lab Units / Activities	Description
(V5) Speedy Delivery: Rethink Section	Students will code the Clawbot to pick up packages and bring them to the Loading Dock as fast as possible in the Package Dash Challenge.

Differentiation:

- For students who need more of a challenge, have them design a new layout with more “packages” at various heights. Objects should also be of varying sizes instead of just aluminum cans to test how the claw will open and close. Ask students to plan out how the Clawbot’s arm and claw will have to raise, lower, open, and close in order to grab the objects and transport them without dropping any. If time permits, have students write code in order to pick up and move these new objects in the Package Dash Challenge.

Week 5 - Loop, There It Is!

Weekly Summary: Students will learn how to code the Clawbot to repeat behaviors using loops, and participate in the Groove Machine Challenge that will make their Clawbot dance.

VEX V5 Educator Certification: Complete Unit 6: Programming Structures before class.

STEM Lab Units / Activities	Description
(V5) Loop, There It Is!: Play Section	Students will practice coding with loops to drive their robot in a square.
(V5) Loop, There It Is!: Rethink Section	Students will code the Clawbot to go through a dance routine using their knowledge of loops to participate in the Groove Machine Challenge.

Differentiation:

- Extend the Squared Loops Challenge for students by asking them to change the parameters of the [Drive for] commands in order for the Clawbot to drive in smaller and larger squares. Students can also adjust the parameters of the [Spin for] commands to open and close the claw, as well as raise and lower the arm for differing degree measures.

Week 6 - Clawbot with Controller

Weekly Summary: Students will learn how to code the Controller using loops and events to participate in the Colored Gems or Relay Race Challenges.

STEM Lab Units / Activities	Description
(V5) Clawbot with Controller: Play Section	Students will explore loops by testing the Tank Drive example project to navigate a slalom course.
(V5) Clawbot with Controller: Rethink Section	Students will practice coding with events to grab and release objects using the Controller to participate in the Colored Gems or Relay Race Challenges.

Differentiation:

- If students are looking for ways to code the Controller, have them complete the Level Up Activity.

Week 7 - To Do, or Not To Do

Weekly Summary: Students will learn how to code the Clawbot to make decisions using conditionals, and participate in the User Interface Challenge that will pick up and replace a variety of ten objects.

STEM Lab Units / Activities	Description
(V5) To Do, or Not To Do: Play Section	Students will practice coding with conditionals by pressing the V5 Brain's screen in order to turn the Clawbot left and right.
(V5) To Do, or Not To Do: Rethink Section	Students will write code that will use the V5 Brain's screen to control the arm and claw motors. The four buttons displayed on the screen will be used to pick up and replace a variety of ten objects in the User Interface Challenge.

Differentiation:

- Add an additional layer of challenge to the User Interface Challenge in the Rethink section by adding two buttons onto the V5 Brain's screen to also drive the Clawbot forward and in reverse.

Week 8 - Treasure Hunt

Weekly Summary: Students will explore path planning, coding the Drivetrain, and coding the claw using individual motors.

STEM Lab Units / Activities	Description
(EXP) Treasure Hunt Lesson 2: Claw No Sensor	Students will learn about planning a path, coding the Drivetrain, and coding the claw in order to create a project in VEXcode V5.

Differentiation:

- During the Collector Challenge in the Compete section, add a layer of complexity by asking the students to use the arm to either stack the objects on top of one another, or introduce a height requirement (by adding books or other classroom objects) into the Starting Zone that the objects must be placed on.

Week 9 - Ring Leader

Weekly Summary: Students will learn about coding the Clawbot to complete autonomous movements. Then, they will apply their learning to create a VEXcode V5 project to pick up and place two ring-shaped objects on a post.

STEM Lab Units / Activities	Description
(EXP) Ring Leader Lesson 3: Coding for Autonomous Movements	Students will learn about coding the Clawbot to complete autonomous movements. Then, they will apply their learning to create a VEXcode V5 project to pick up and place two ring-shaped objects on a post.

Differentiation:

- For students who finish early or want to learn more about how the skills they have learned in the lesson can be used in industry, have them complete a choice board option.