

# OCTOBER

## Week 1: October 7

### Introduction

Stem activities and free builds to learn the ins and outs of the VEX kits, creating structures and signs, and creative problem solving.

KEY CONCEPTS: Engineering, Art, Spatial Reasoning

## Week 2: October 14

### STEM Lab Unit: Tug of War

STEM lab unit exploring how mechanical advantage and center of mass affects the bot's ability to pull objects.

KEY CONCEPTS: Center of Mass, Mechanical Advantage

## Week 3: October 28

### Tug of War (continued)

STEM lab unit exploring how mechanical advantage and center of mass affects the bot's ability to pull objects.

KEY CONCEPTS: Center of Mass, Mechanical Advantage

# NOVEMBER

## Week 4: November 11

### STEM Activities

Bot and free build activities to demonstrate tire grip, moving on an incline, forward and backward motion, and how to calculate the pitch of gears and sprockets.

KEY CONCEPTS: Engineering, Programming, Measurement, Friction

## Week 5: November 18

### STEM Lab Unit: Team Freeze Tag

A team-based competition in which students will drive the bots, choose wheels, and add sensors to compete in a game of freeze tag.

KEY CONCEPTS: Controller, Sensors, Programming

# DECEMBER

## Week 6: December 2

### Team Freeze Tag (continued)

Bot and free build activities to demonstrate tire grip, moving on an incline, forward and backward motion, and how to calculate the pitch of gears and sprockets.

KEY CONCEPTS: Engineering, Programming, Measurement, Friction

## Week 7: December 9

### STEM Activities

Bot builds with a focus on programming to navigate and move along a pre-defined path.

KEY CONCEPTS: Programming

## Week 8: December 16

### STEM Lab Unit: Robot Soccer

A simple ClawBot build exercise in which students will use learned engineering concepts to grab, pass, and score in a robot soccer competition.

KEY CONCEPTS: Engineering

# JANUARY

## Week 9: January 6

### Robot Soccer (continued)

A simple ClawBot build exercise in which students will use learned engineering concepts to grab, pass, and score in a robot soccer competition.

KEY CONCEPTS: Engineering

## Week 10: January 13

### STEM Activities

BaseBot and simple ClawBot activities surrounding the VEX Controller. Students will program their bots to transport loads.

KEY CONCEPTS: Programming, Controller

## Week 11: January 20

### STEM Lab Unit: Cube Collector

Our most challenging unit yet! Students will see the difference between driver-controlled and autonomous movement.

KEY CONCEPTS: Controller, Programming, Game Strategy

## Week 12: January 27

### Cube Collector (continued)

Our most challenging unit yet! Students will see the difference between driver-controlled and autonomous movement.

KEY CONCEPTS: Controller, Programming, Game Strategy

# FEBRUARY

## Week 13: February 3

### STEM Lab Unit: Up and Over

Students will design a ClawBot to transport loads across great distances.

KEY CONCEPTS: Engineering

## Week 14: February 10

### Up and Over (continued)

Students will design a ClawBot to transport loads across great distances.

KEY CONCEPTS: Engineering

## Week 15: February 17

### STEM Lab Unit: Treasure Hunt

Students will make use of their sensor and programming knowledge to code their ClawBots to recognize and collect specifically colored cubes.

KEY CONCEPTS: Optical Sensors, Programming

# MARCH

## Week 16: March 2

### Treasure Hunt (continued)

Students will make use of their sensor and programming knowledge to code their ClawBots to recognize and collect specifically colored cubes.

KEY CONCEPTS: Optical Sensors, Programming

## Week 17: March 9

### STEM Activities

Measurement and programming concepts will be employed to design and navigate mazes, calculate wheel speed, and navigate around an obstacle via the Distance Sensor.

KEY CONCEPTS: Programming, Measurement, Distance Sensor

## Week 18: March 16

### STEM Lab Unit: Castle Crasher

Both Optical and Distance Sensors will be used to locate, crash into, and clear student-designed cube "castles" in the Castle Crasher competition.

KEY CONCEPTS: Distance and Optical Sensors, Programming, Algorithms

# APRIL

## Week 19: April 6

### Castle Crasher (continued)

Both Optical and Distance Sensors will be used to locate, crash into, and clear student-designed cube "castles" in the Castle Crasher competition.

KEY CONCEPTS: Distance and Optical Sensors, Programming, Algorithms

## Week 20: April 13

### STEM Activities

Students will employ their programming skills to code their BaseBots to navigate, drive, and push objects.

KEY CONCEPTS: Programming

## Week 21: April 27

### STEM Activities

Free builds and BaseBot builds that expand upon existing programming and sensor skills. We'll incorporate colored lights from Touch LED sensors and program bots to move based on hand movement near the Distance Sensors.

KEY CONCEPTS: Programming, Distance Sensor

# MAY

## Week 22: May 4

### STEM Activities

Students will free build bots to create a pinball game using simple machines, and then design and build a bot powered only by rubber bands.

KEY CONCEPTS: Engineering

## Week 23: May 11

### STEM Lab Unit: Full Volume

Our final club challenge! Students will use the HeroBot, Byte, to play the 2023-2024 VIQRC Full Volume game and compete in a Robot Skills Match.

KEY CONCEPTS: Competition

## Week 24: May 18

### Full Volume (continued)

Our final club challenge! Students will use the HeroBot, Byte, to play the 2023-2024 VIQRC Full Volume game and compete in a Robot Skills Match.

KEY CONCEPTS: Competition

