



# Automation & Robotics Virtual Learning

## 7th & 8th Virtual Robots

Vex VR - STEM LAB Coding a Vex Robot

May 11, 2020



PLTW: Automation & Robotics  
Lesson: May 11, 2020

**Objective/Learning Target:**

Students become familiar with the interface & movement controls of the VEXcode VR environment.

# Warm-up

In our classroom, we have VEX EDR robots which are currently run by coding them in **RobotC**. **RobotC** code that is written to move or give commands to a Vex Robot requires setting up what are called **Pragma** Statements.

**Pragma** is short for pragmatic information. So, in plain English, pragmatic is an adjective that means sensible and practical. In programming, **pragma** refers to the code that consists of useful information on how a compiler or microcontroller should process the program. In other words it sets up the program to tell a Vex robot what items such as a motor or sensor are connected to what part such as a wheel or mechanism.

A code to move a VEX EDR robot forward might look like this:

```
Task Main()
{
startMotor(RTWheel, 90);
startMotor(LTWheel, 90);
wait(0.5);
stopMotor(RTWheel);
stopMotor(LTWheel);
}
```

Of course the more you want to do that the more complex the code gets.

Take a moment to write what a **pragma statement** is in these [focused notes](#).

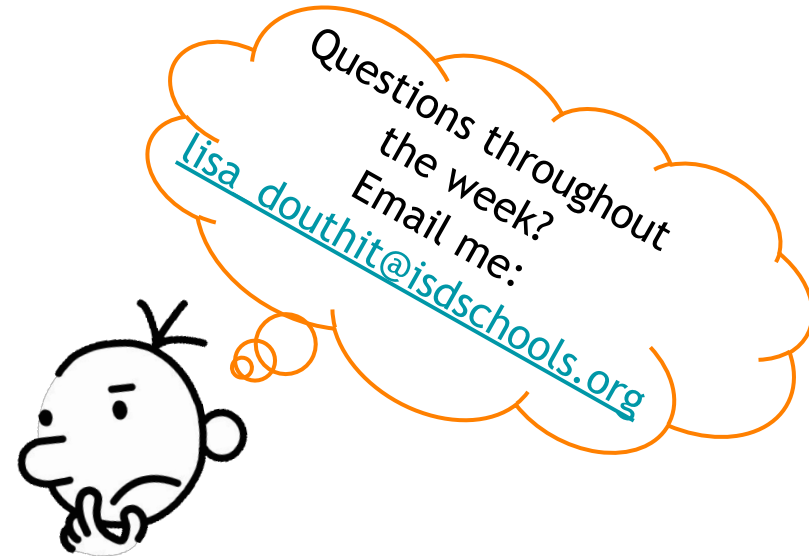
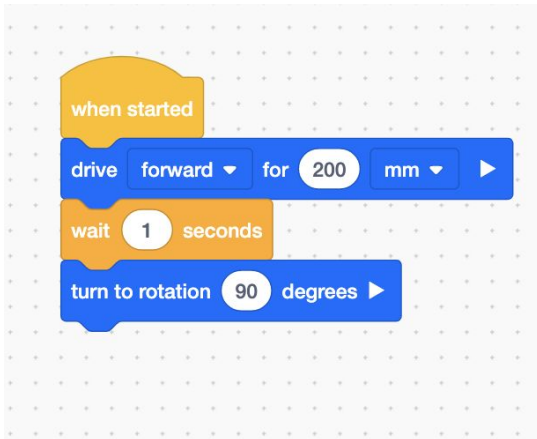
What does the command **startMotor** mean?

Why do you think there are parenthesis at the top and bottom of the program?

# Warm-up

Some VEX robots can use a different code. This is called VEXcode VR. VEXcode VR lets you code a virtual robot using a block based coding environment powered by Scratch Blocks.

VEXcode to move a Vex EDR robot can look like this:



Go back to your focused notes.

Take a moment to write Is this code different than RobotC?

How?

Does the code accomplish a similar task?

How?

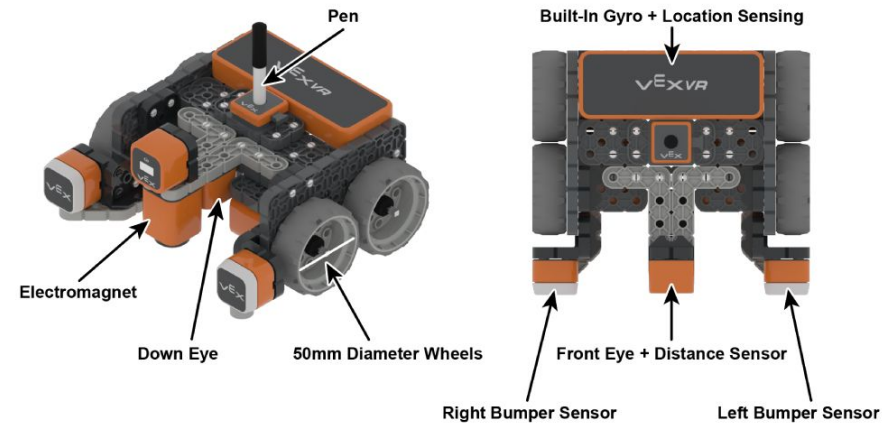
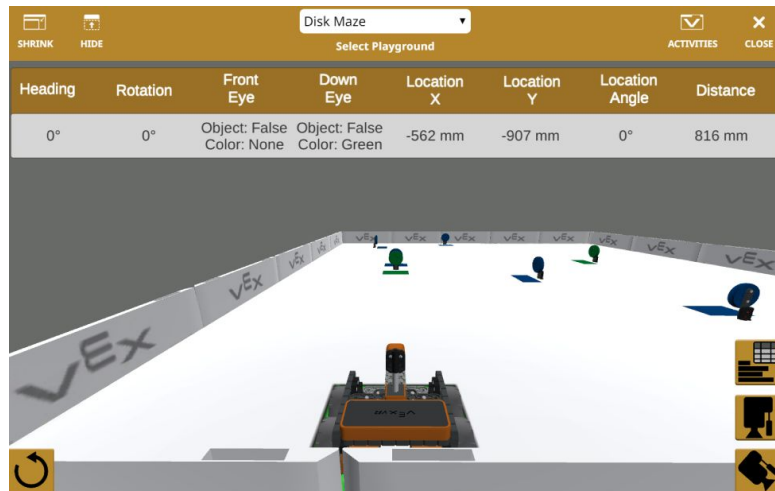
## Lesson/Background:

We all know that robots make Computer Science (CS) come to life with real world applications. Now CS learning can continue while you are at home even without your VEX robots.

### A Look Inside the VEXcode Platform

#### Virtual Robot

VEXcode VR utilizes a pre-built virtual robot. The VR Robot makes navigation easy, and has sensors that can be used to solve mazes. It also has a pen that allows students to code a creative drawing.



#### Virtual Playgrounds

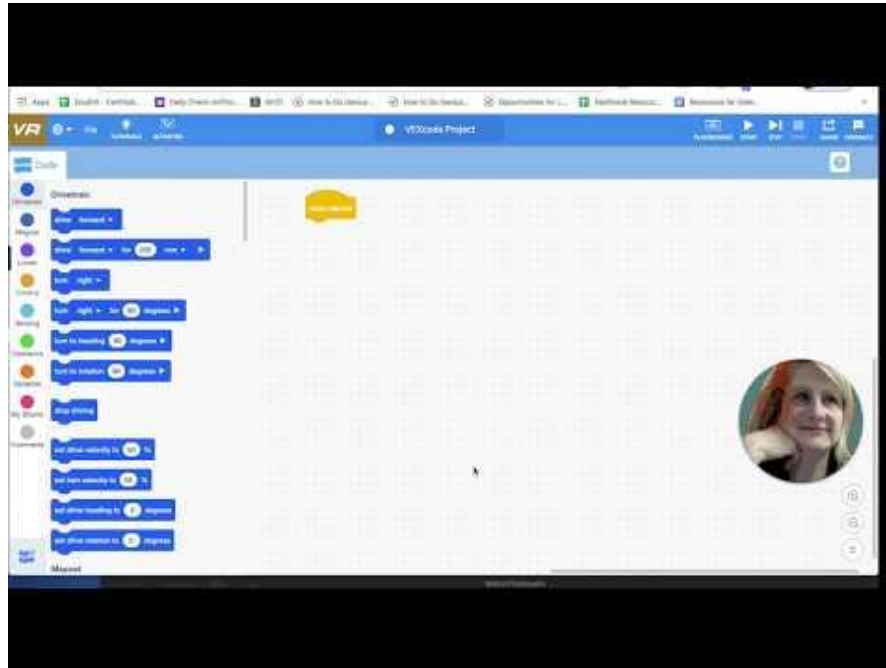
You can choose from different, virtual 3D playgrounds to use the virtual robot's features. Playgrounds include a grid map, an art canvas, and a walled maze.

**Now...ALL that code? It is still there but it is hidden within the blocks. Your focus for these lessons will be understanding the concepts of movement and problem solving.**

## Practice:

In your first lesson you will simple practice by getting to know the tools of the programming environment.

**Watch the short video**



**GO to [vr.VEX.com](https://vr.VEX.com)**

**Click on Tutorials & do ALL three tutorials to get to know your workspace. Write any notes you need to on your focused notes such as a command you saw you want to try later. Where to find the playgrounds, etc.**

## Practice/Challenge:

Answer ALL questions below in your focused notes. Question on the left, answers on the right.

# Movement

## Distance Drive Challenge

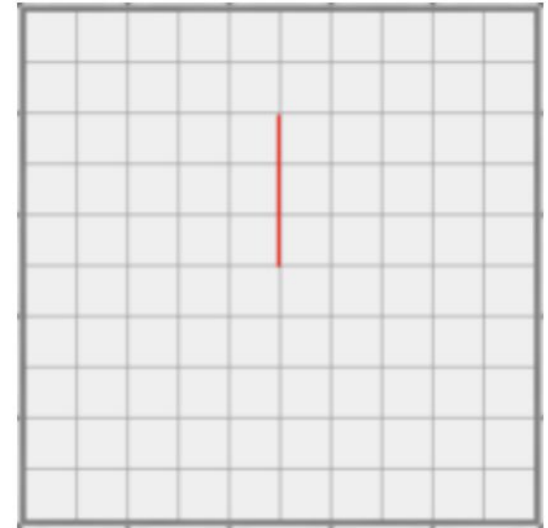
**Playground:** Grid Map

**Challenges:**

**Level 1:** Program the VR Robot to drive forward 3 grid squares. How far should you program the VR Robot to move if you want it to travel 3 grid squares?

**Level 2:** Program the VR Robot to drive forward 6 grid squares, turn around, and drive back 6 grid squares. How many degrees did you have to turn to face the way you came? What is the total distance traveled? Use a calculator and/or pencil and paper to find out.

**Level 3:** Program the VR Robot to drive in a square. Make each side of the square 3 grid squares long. What is the area of your square in mm? Use a calculator and/or pencil and paper to find out.



**Helpful Hints:**

- Each square in the Grid Map measures 200mm by 200mm.
- Try changing the distance to program the VR Robot to move shorter or farther distances on the *Drive for* block from the Drivetrain category.



# VEX CODE VR

**Extend your learning:**

Want to know more about visual or block based coding?

[Check out this article!](#)





Questions/Main Ideas:

Summary/Reflection