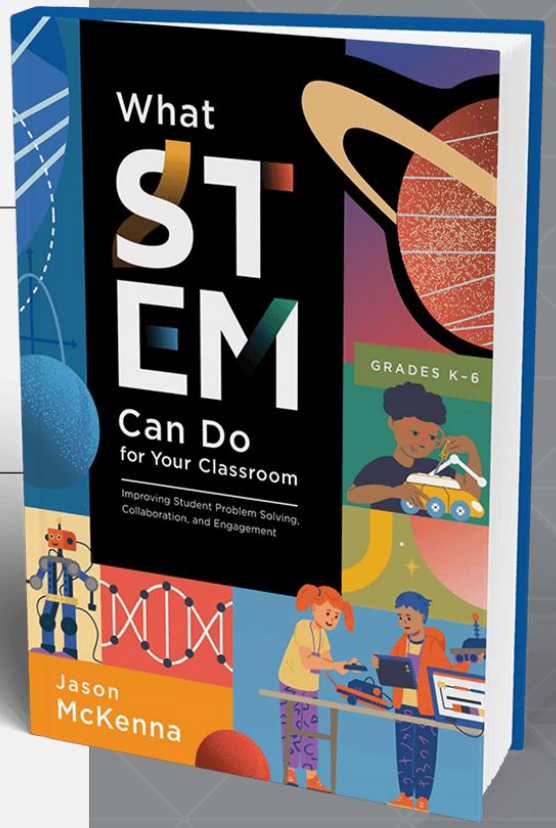
VEX 123 and VEX GO

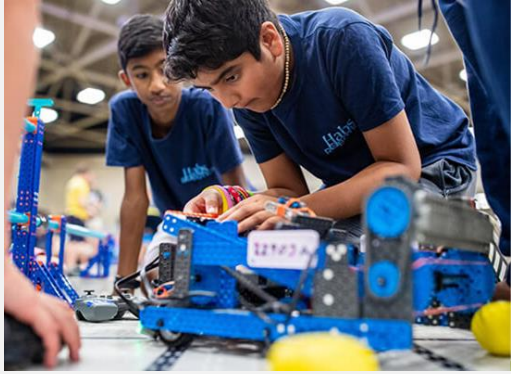
Jason McKenna

Director of Global Educational Strategy, VEX Robotics

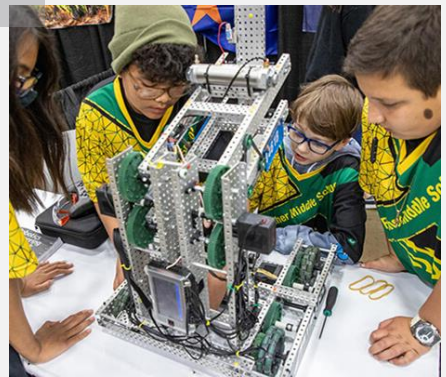
What STEM Can Do for Your Classroom:
Improving Student Problem Solving, Collaboration, and Engagement

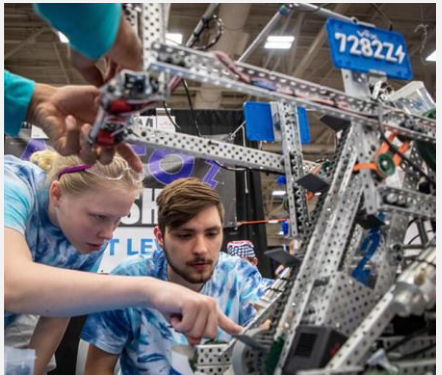


jmckenna.org
@MckennaJ72



Who Is VEX?





World's Largest Robotics Competition

The VEX Continuum

VEX 123

Coding Starts Early

Ages 4+

VEX GO

STEM Starts Early

Ages 8+

VEX IQ

Applied STEM Learning

Ages 11+

VEX EXP

Real World STEM for Classrooms

Ages 14+

VEX V5

Real World STEM for Competition

Ages 14+

VEX V5 WORKCELL

Workforce Readiness

Ages 14+

VEX CODE VR

Virtual Robot Coding

Ages 8+

What is VEX 123?

- **Takes Computer Science off the screen and brings it to life**
- Can code in multiple ways
- Easy to learn & easy to teach
- Designed by teachers, for teachers
- Free curricular materials and teacher support resources

Three Ways to Code

1

Touch Coding

2

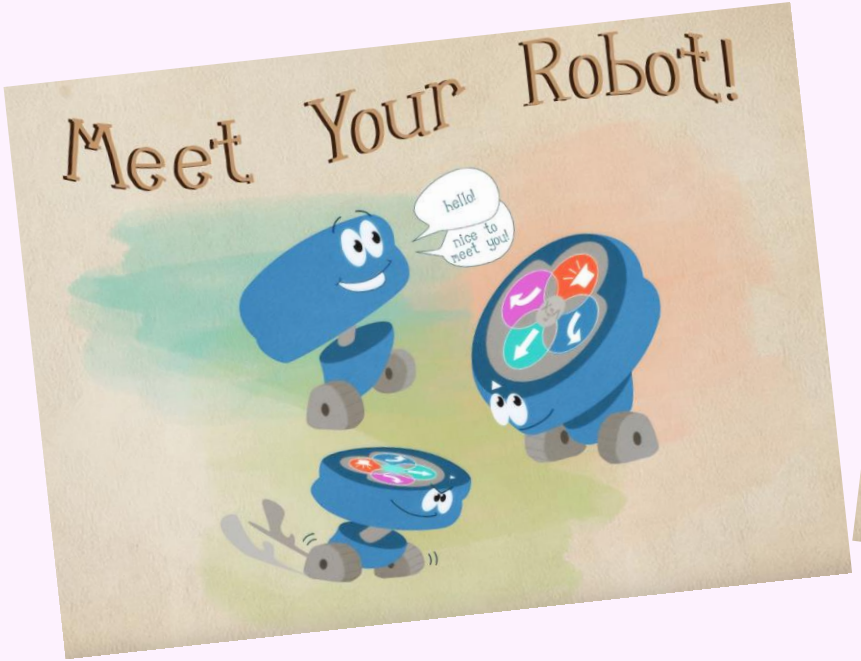
Coder and Coder Cards

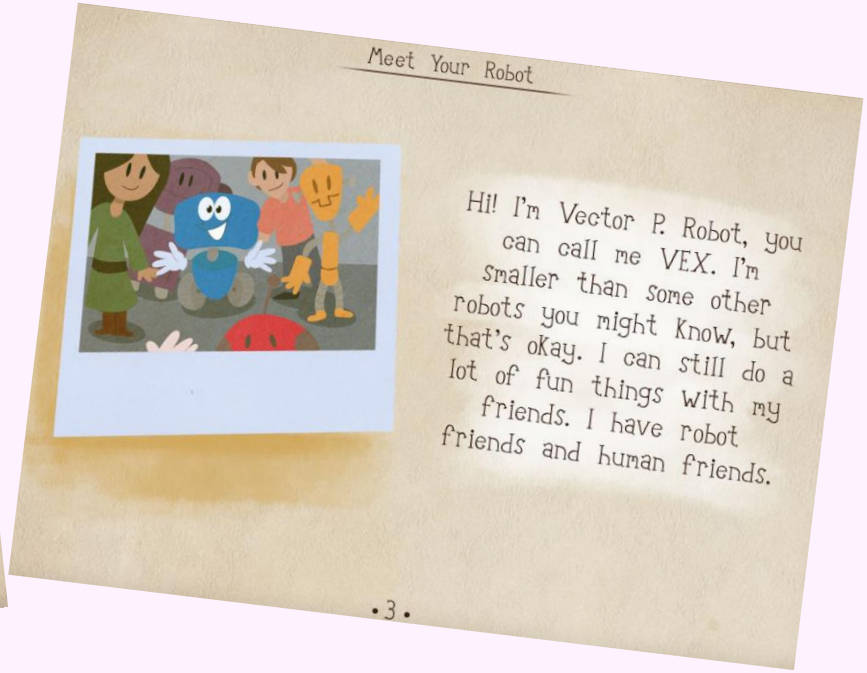
3

VEXcode 123

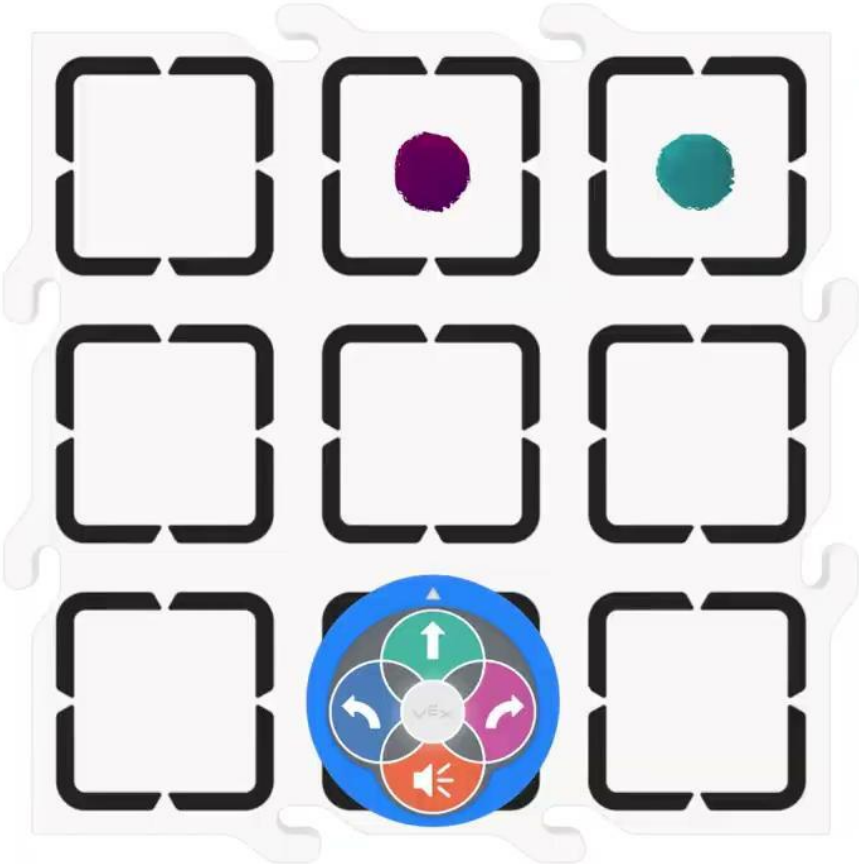
Why Should Coding Start Early?

Meet Your Robot Storybook





Touch to Code



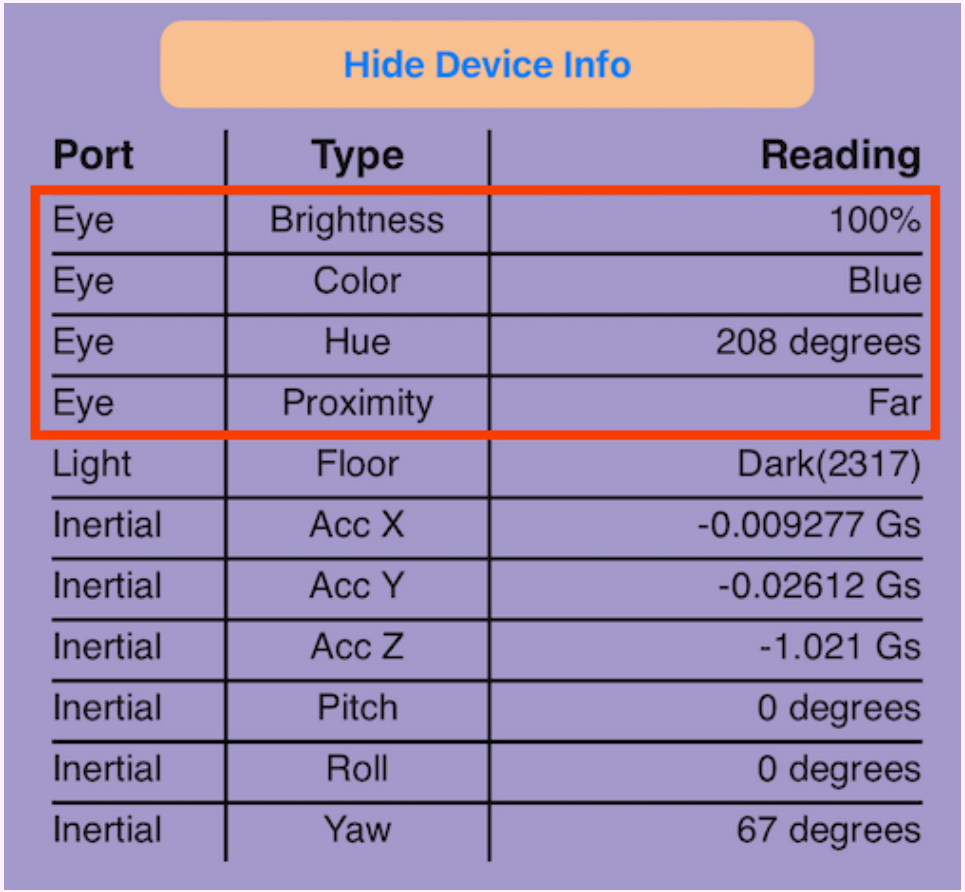
Decorate Your Robot!

Why teach CS with VEX 123?

Using the Coder

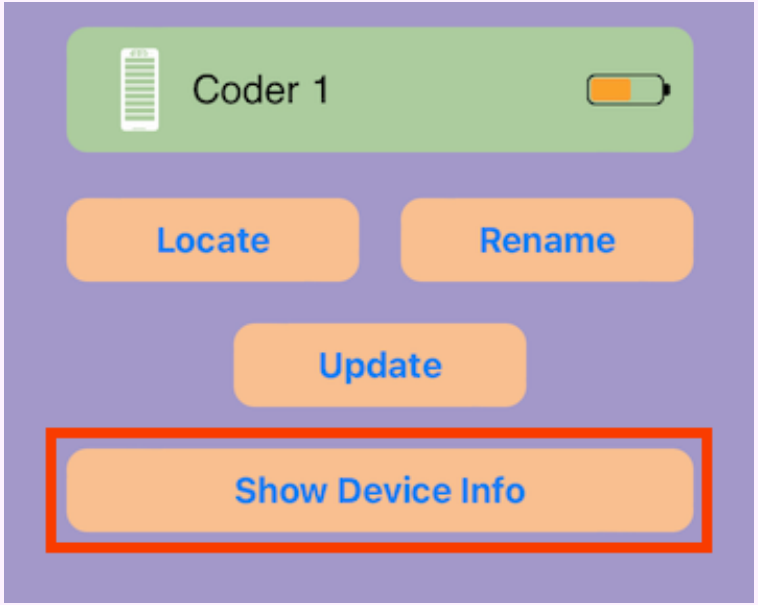
Using the Coder as a Teaching Tool

Using the Classroom app



Port	Type	Reading
Eye	Brightness	100%
Eye	Color	Blue
Eye	Hue	208 degrees
Eye	Proximity	Far
Light	Floor	Dark(2317)
Inertial	Acc X	-0.009277 Gs
Inertial	Acc Y	-0.02612 Gs
Inertial	Acc Z	-1.021 Gs
Inertial	Pitch	0 degrees
Inertial	Roll	0 degrees
Inertial	Yaw	67 degrees

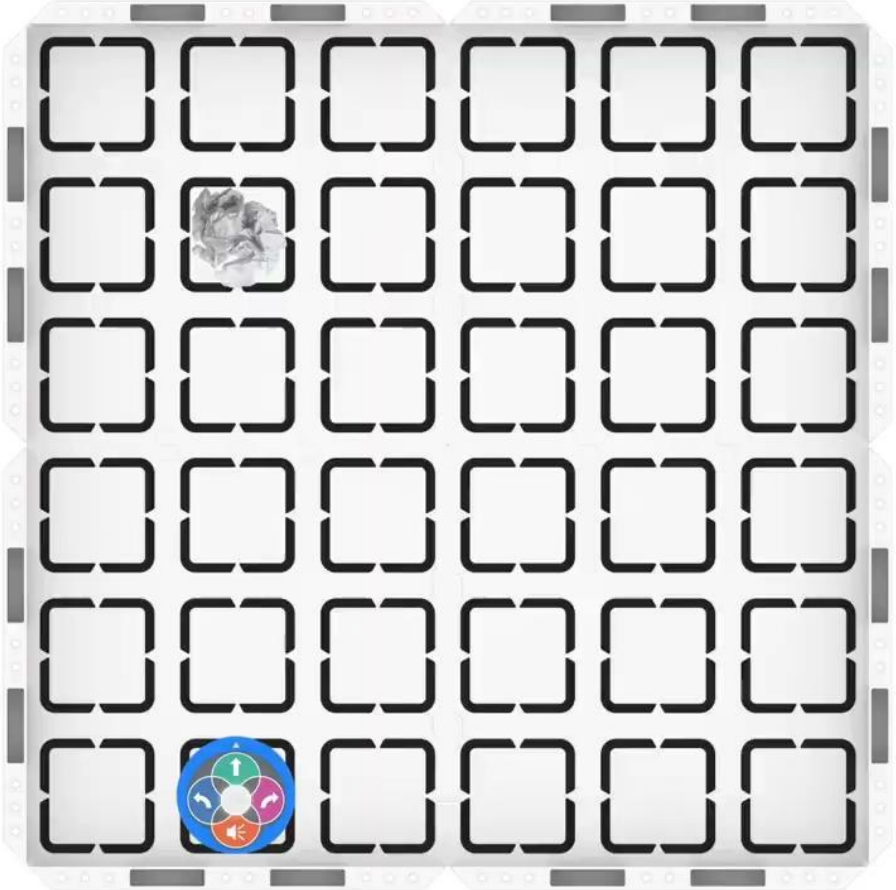
Using the Classroom app



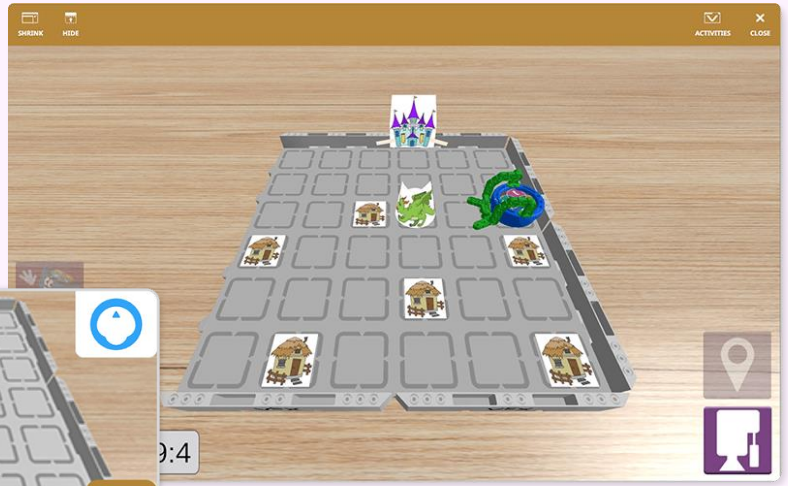
Introduction to VEXcode 123

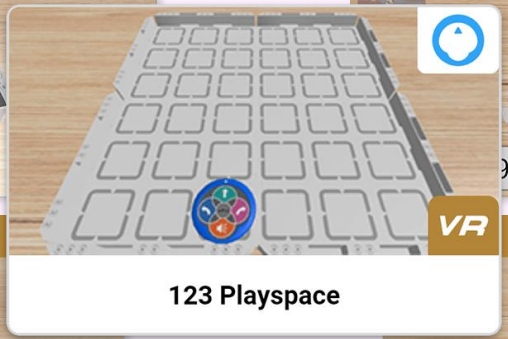
VEXcode 123

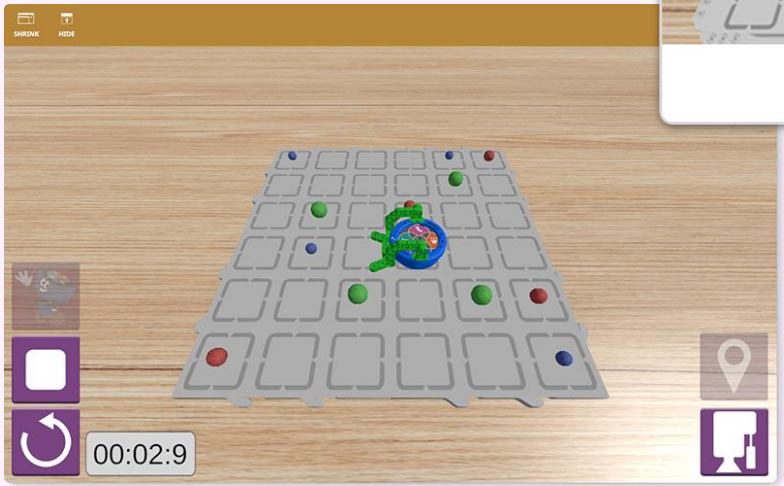
when started
drive forward until object
glow green
wait 2 seconds
glow off



VEXcode VR - 123 Playgrounds







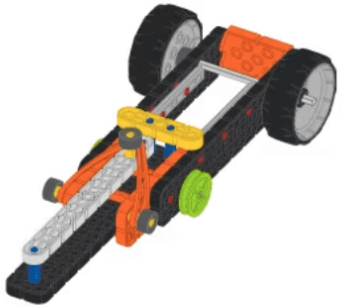
What is VEX GO?

- Grades 3+
- Adapted VEX plastic construction system for elementary students
- Allows young students to investigate, tinker, explore, make mistakes and try again
- Fosters critical learning at an age when young minds are still open to their full potential

Build JOSH - Intro to Building Book

VEX GO Builds

Spring Car



Car that uses the physics of a slingshot to propel movement. In this build, the "slingshot" feature is built into the car, and can be launched from any solid surface.

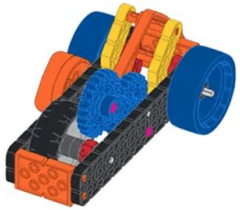
3D Build instructions >

Build instructions >

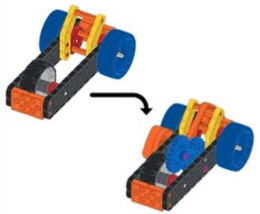
Simple Machines STEM Labs >

Unpowered Super Car

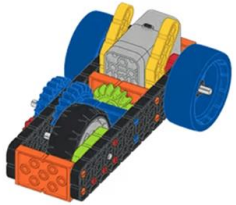
Super Car



Unpowered Super Car to Super Car



Motorized Super Car

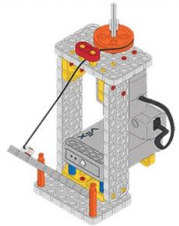


Adaptation Claw

Inclined Plane

Scale Lever

Drawbridge



Frog Life Cycle

Magnet Car

Pendulum

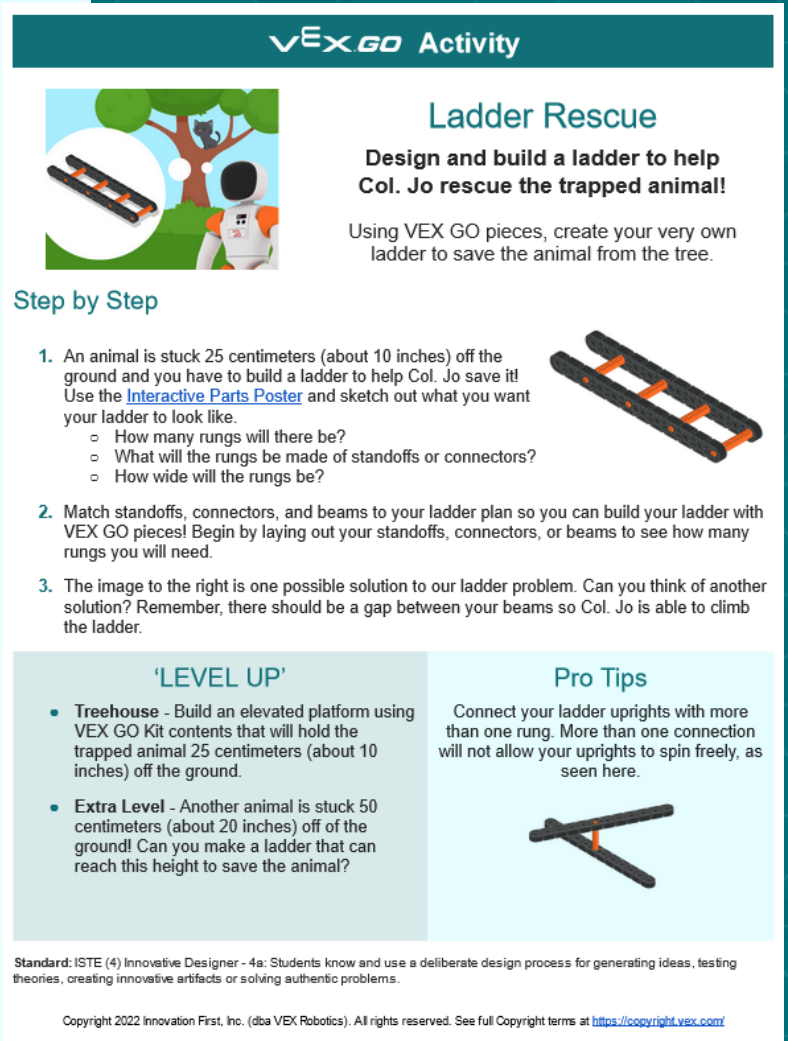
Bunny Traits

Ladder Rescue Activity

Design and build a ladder to help Col. Jo rescue the trapped animal

Goal of the Activity:

An animal is 25 centimeters off of the ground and you have to build a ladder to help Col. Jo save it.



VEX GO Activity

Ladder Rescue

Design and build a ladder to help Col. Jo rescue the trapped animal!

Using VEX GO pieces, create your very own ladder to save the animal from the tree.

Step by Step

1. An animal is stuck 25 centimeters (about 10 inches) off the ground and you have to build a ladder to help Col. Jo save it! Use the Interactive Parts Poster and sketch out what you want your ladder to look like.
   - How many rungs will there be?
   - What will the rungs be made of standoffs or connectors?
   - How wide will the rungs be?
2. Match standoffs, connectors, and beams to your ladder plan so you can build your ladder with VEX GO pieces! Begin by laying out your standoffs, connectors, or beams to see how many rungs you will need.
3. The image to the right is one possible solution to our ladder problem. Can you think of another solution? Remember, there should be a gap between your beams so Col. Jo is able to climb the ladder.

'LEVEL UP'

- **Treehouse** - Build an elevated platform using VEX GO Kit contents that will hold the trapped animal 25 centimeters (about 10 inches) off the ground.
- **Extra Level** - Another animal is stuck 50 centimeters (about 20 inches) off of the ground! Can you make a ladder that can reach this height to save the animal?

Pro Tips

Connect your ladder uprights with more than one rung. More than one connection will not allow your uprights to spin freely, as seen here.

Standard: ISTE (4) Innovative Designer - 4a: Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

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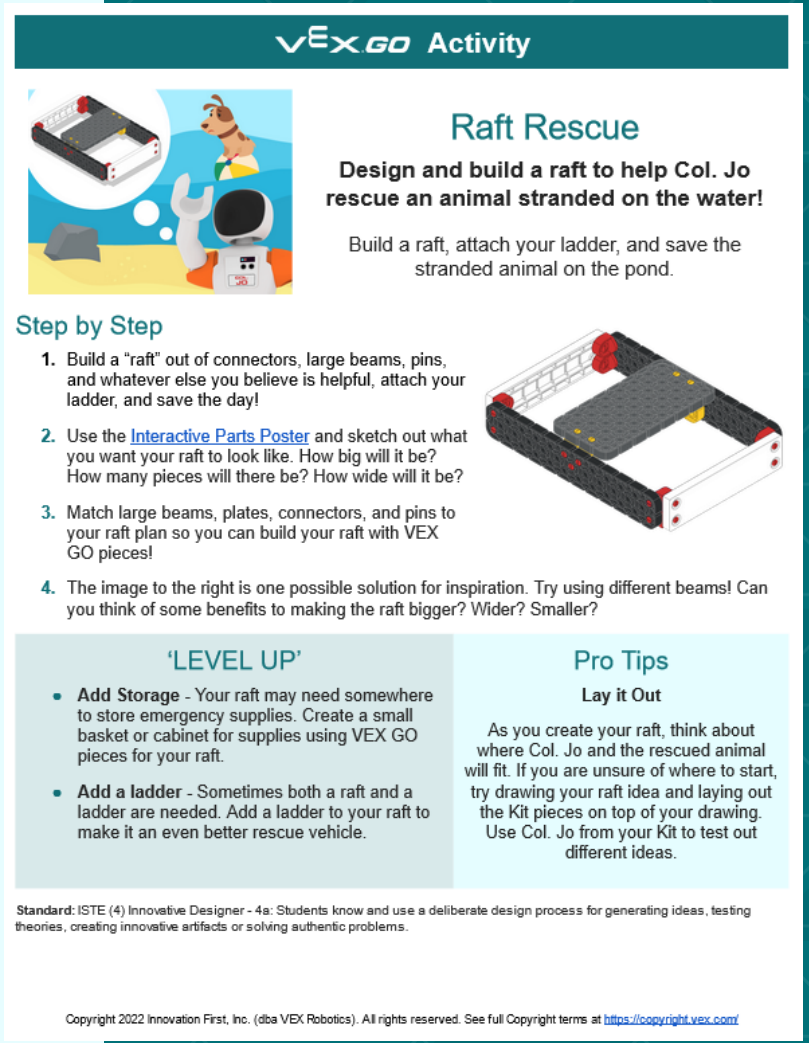
Raft Rescue Activity

Design and build a raft to help Col. Jo rescue an animal stranded on the water?

Goal of the Activity:

Build a “raft” out of connectors, large bams, pins and whatever else you think is helpful. Next, attach your ladder and save the day.



VEX GO Activity

Raft Rescue

Design and build a raft to help Col. Jo rescue an animal stranded on the water!

Build a raft, attach your ladder, and save the stranded animal on the pond.

Step by Step

1. Build a “raft” out of connectors, large beams, pins, and whatever else you believe is helpful, attach your ladder, and save the day!
2. Use the Interactive Parts Poster and sketch out what you want your raft to look like. How big will it be? How many pieces will there be? How wide will it be?
3. Match large beams, plates, connectors, and pins to your raft plan so you can build your raft with VEX GO pieces!
4. The image to the right is one possible solution for inspiration. Try using different beams! Can you think of some benefits to making the raft bigger? Wider? Smaller?

‘LEVEL UP’

- **Add Storage** - Your raft may need somewhere to store emergency supplies. Create a small basket or cabinet for supplies using VEX GO pieces for your raft.
- **Add a ladder** - Sometimes both a raft and a ladder are needed. Add a ladder to your raft to make it an even better rescue vehicle.

Pro Tips

Lay it Out

As you create your raft, think about where Col. Jo and the rescued animal will fit. If you are unsure of where to start, try drawing your raft idea and laying out the Kit pieces on top of your drawing. Use Col. Jo from your Kit to test out different ideas.

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Mobile Rescue Activity

Make your raft mobile to help your neighbors. Attach wheels to your raft to turn it into a fire truck.

Goal of the Activity:

The neighboring town needs help. Attach wheels to your raft to make it a fire truck to drive to the town and save the day.

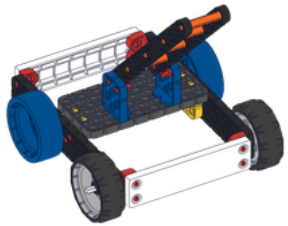
VEX GO Activity

Mobile Rescue

Make your raft mobile to help your neighbors!

Attach wheels to your raft to turn it into a fire truck, and use it to save the day in the town over.

Step by Step



1. The neighboring town needs help! Attach wheels to your raft to make it a fire truck, drive over, and save the day!
2. Make a plan for how you will add wheels to your raft to get you to the next town. How are you going to attach your wheels? How many wheels will you use?
3. Add the wheels according to your plan. Is your fire truck able to move?
4. Once you have everything assembled, add a personal touch! Add decorations and or more pieces of equipment that you think are necessary for a fire rescue operation.

'LEVEL UP'

- **Extra Level** - Can you build a ladder to reach objects at the height of 50 centimeters (about 20 inches) from the ground? Having a ladder that reaches higher allows a Fire Truck to be more dependable. Make sure to balance your chassis to hold the ladder upright!
- **Movable Ladder** - Can you control your ladder with a knob like this image? A ladder that can be put up or down means you can travel a lot easier with the ladder attached.

Pro Tips

Connection Point

Take note of the different holes on the wheels! The blue wheel has a round hole, while the gray wheel and green pulley have square holes. A circular hole allows you to connect the wheel to the base with pins and standoffs, while the square hole can be connected to the base with a shaft. Remember, pins snap into place, while shafts do not, meaning you have to secure it with something (like a rubber shaft collar!).

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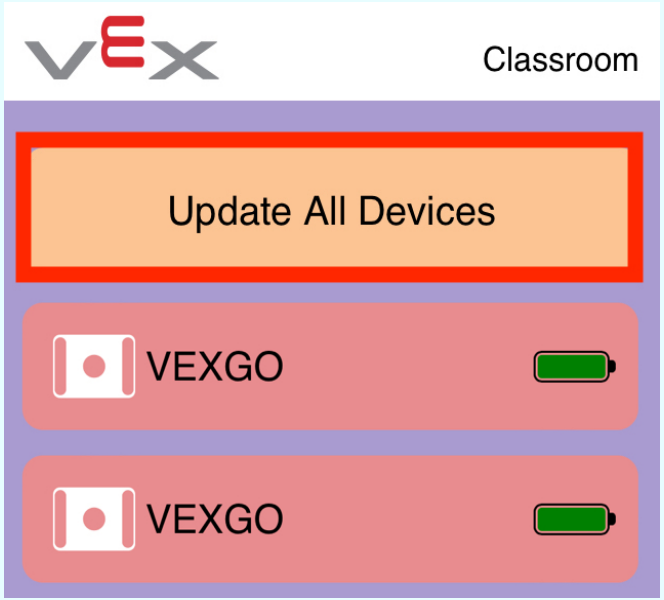
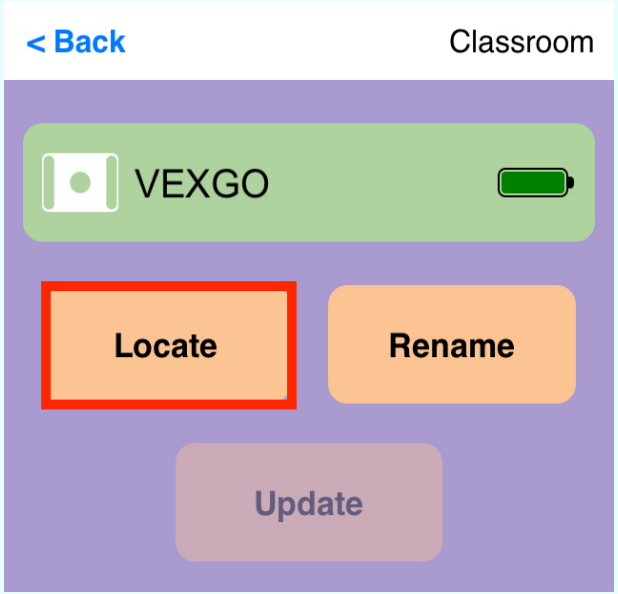
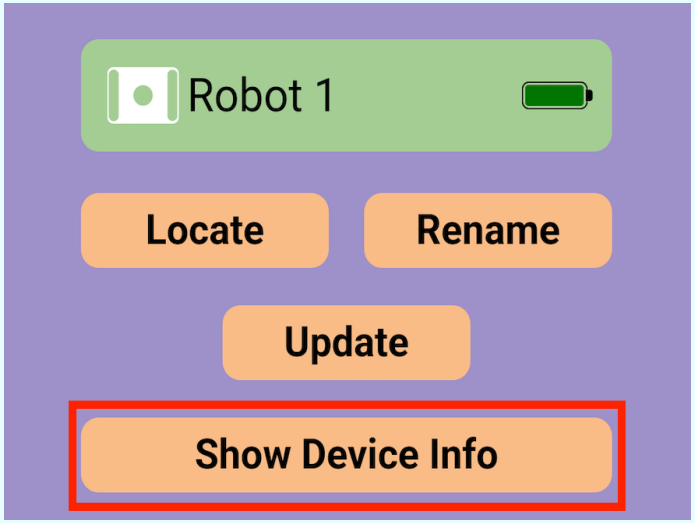
Using the Classroom App

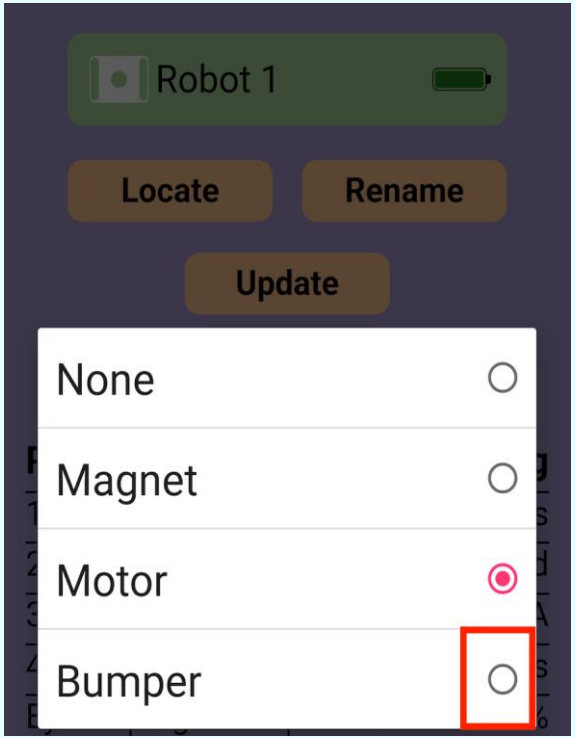




Using the Classroom App - Troubleshooting



Port	Type	Reading
1	Motor	36 degrees
2	Bumper	Released
3	Magnet	N/A
4	Motor	-47 degrees
Eye	Brightness	76%
Eye	Color	N/A
Eye	Hue	74 degrees
Eye	Proximity	Far
Inertial	Acc X	0.02515 Gs
Inertial	Acc Y	0.004639 Gs
Inertial	Acc Z	-0.9904 Gs
Inertial	Pitch	0 degrees
Inertial	Roll	0 degrees
Inertial	Yaw	54 degrees



Ocean Emergency

VEX GO STEM Labs

Teacher Portal

Ocean Emergency

3 Labs

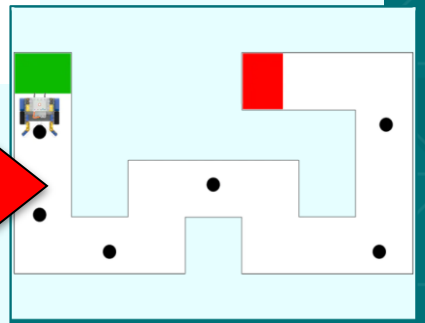
Apply coding skills to help clean up the ocean using Code Base and VEXcode GO.

Lab 1

Plan and Build

Lab 2

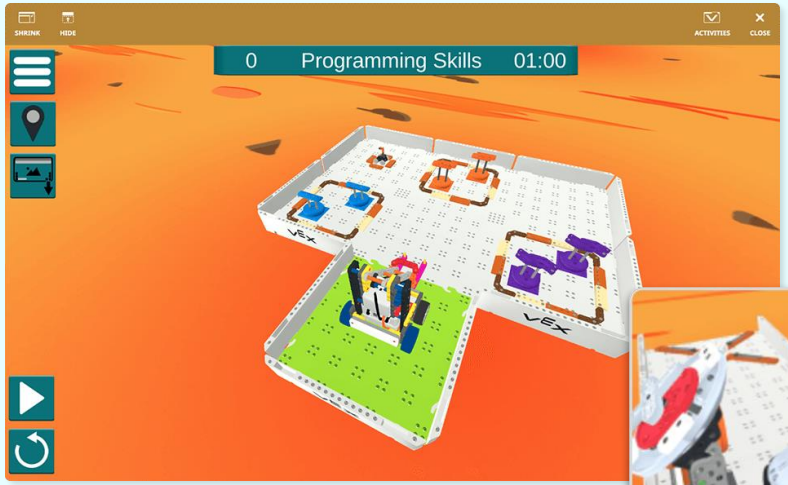
Drive and Apply

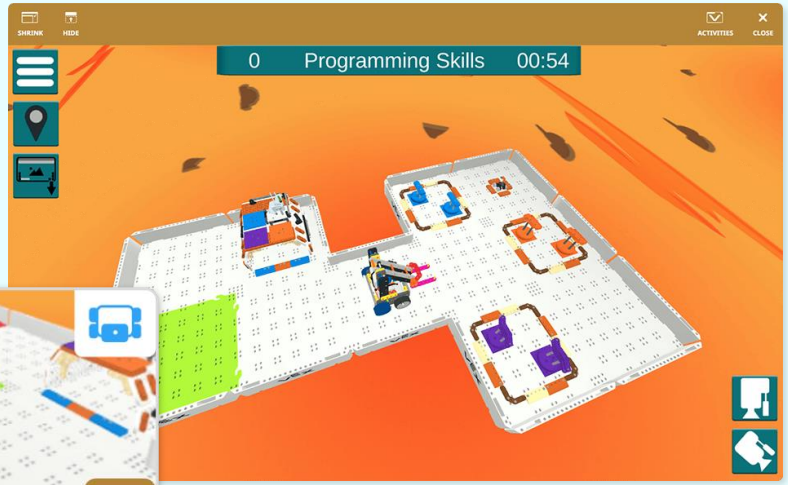


Lab 3

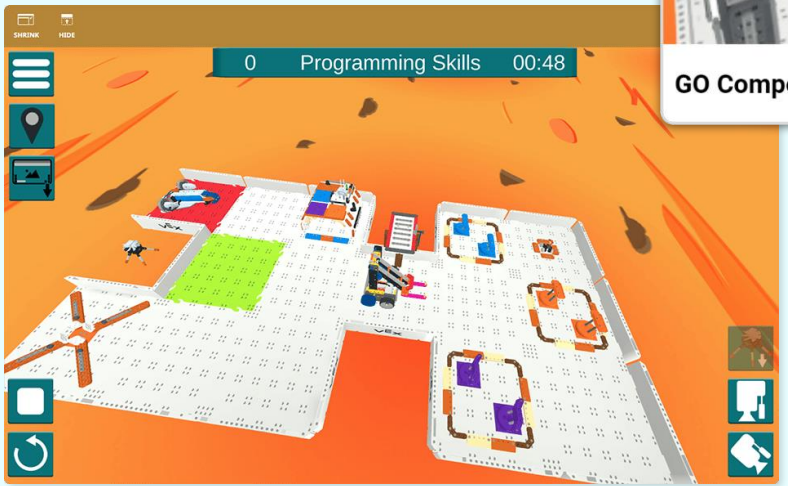
Practice and Drive

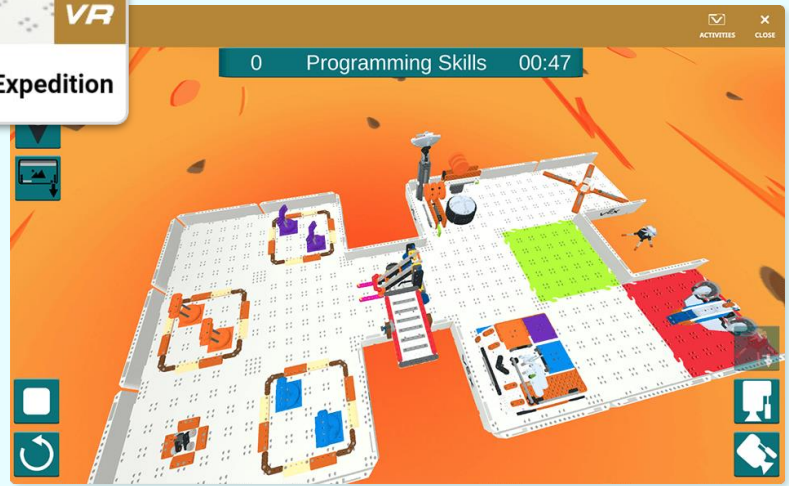
VEXcode VR - GO Playgrounds



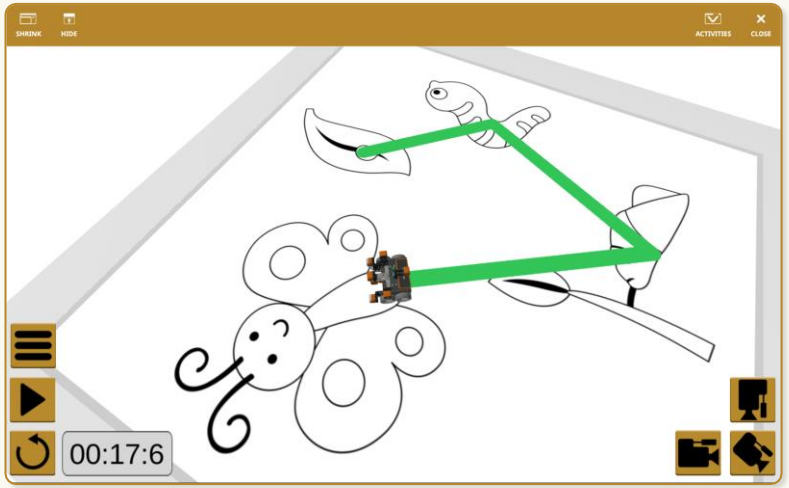


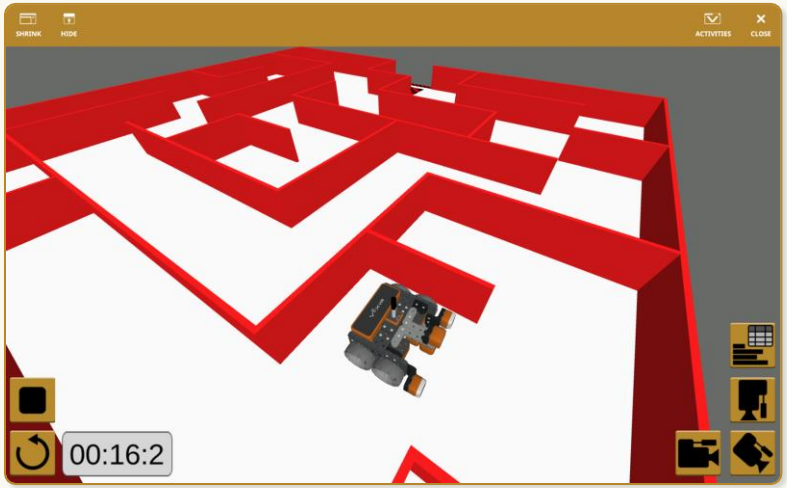
GO Competition - Mars Math Expedition





What is VEXcode VR?





VEXcode VR Reach

Launched April 2020

14.6+ Million
Coding Sessions

6.1+ Million
Hours of Coding

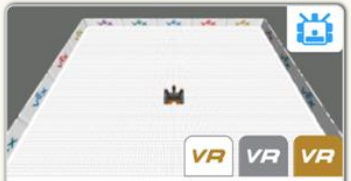
80+ Minutes
Average User Engagement

215+ Countries
Reached

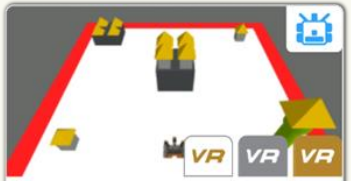
5.5+ Million
Unique Users

260+ Million
Projects Ran

Variety of Playgrounds

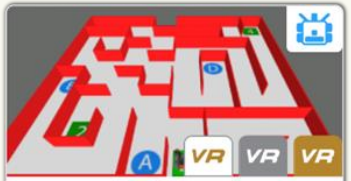


Art Canvas

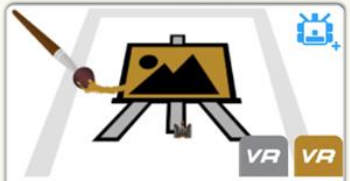


Castle Crasher

Grid Map

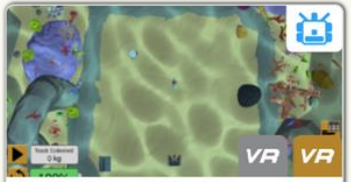


Wall Maze

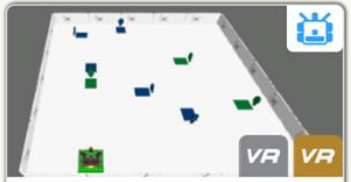


Art Canvas+

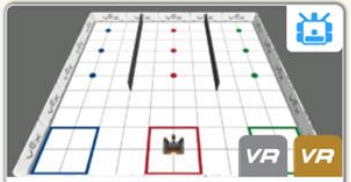
Castle Crasher+



Coral Reef Cleanup



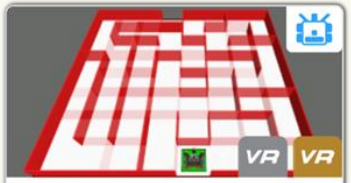
Disk Maze



Disk Mover

Disk Transport

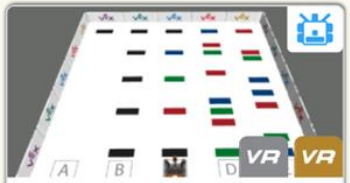
Dynamic Castle Crasher



Dynamic Wall Maze

Encoded Message

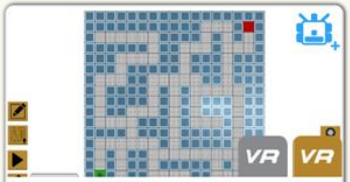
Hidden Pixel Art



Line Detector

Number Grid Map

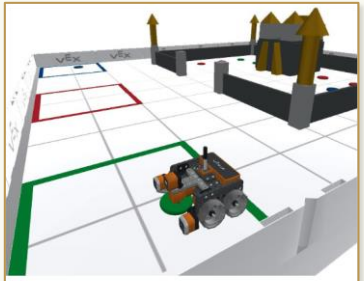
Shape Tracer



Wall Maze+

Planet HEXBUG

Online Computer Science Courses

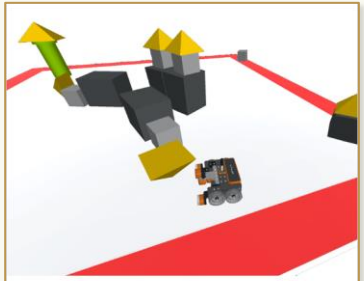


Computer Science Activities + Resources

Access a library of activities and resources to implement VEXcode VR within an existing lesson or as a stand-alone fun activity.

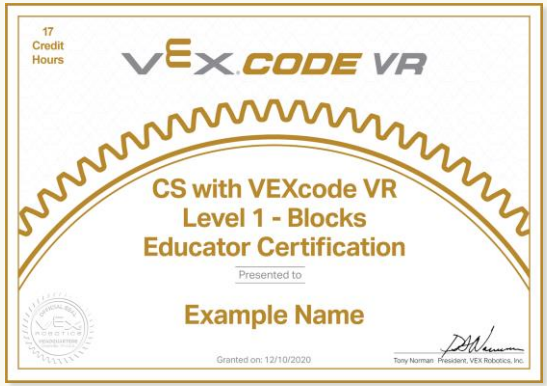
Computer Science Level 1 - Blocks

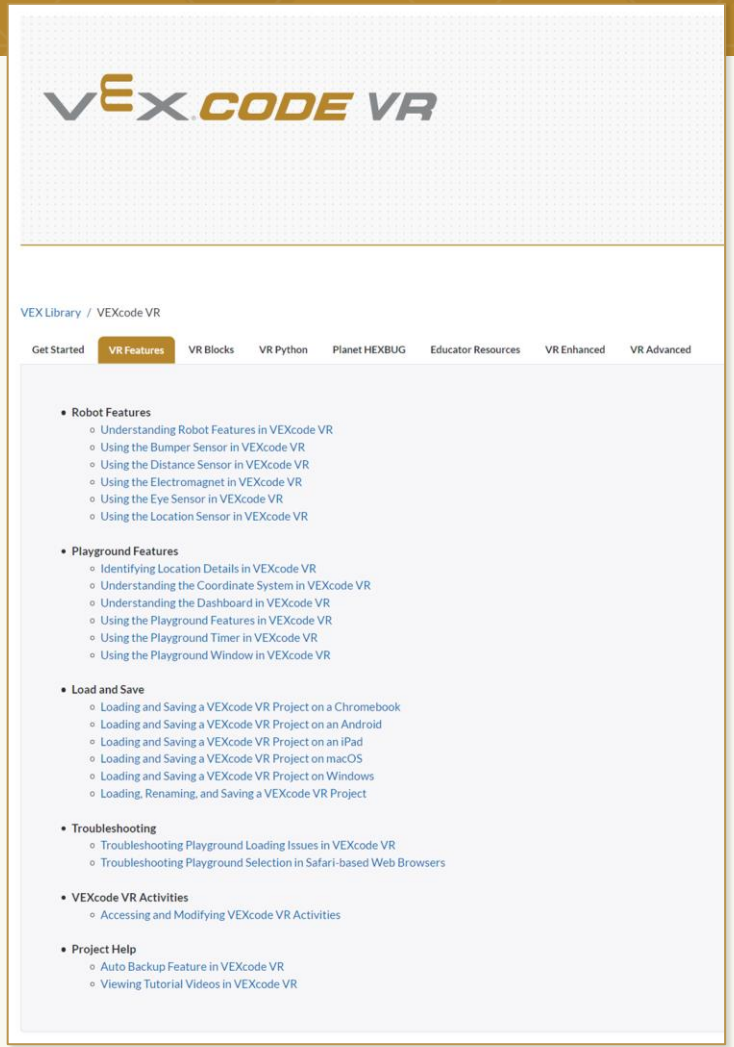
Begin the journey into learning Computer Science with the VEXcode VR Computer Science Level 1 - Blocks course! Using VEXcode VR and engaging robotics-based activities, students will learn about project flow, loops, conditionals, algorithms.



Computer Science Level 1 - Python

Continue on your Computer Science journey with text-based coding in VEXcode VR Python! Using a VR Robot to solve various coding challenges, students will learn about project flow, loops, conditions, and algorithms in Python.





Activities

Castle Color Match

Program the VR Robot to pick up and place disks around the Castle!

Draw a House

Showcase your artistic skills by programming the VR Robot to draw a house.

Dynamic Wall Maze

Create an algorithm to navigate the VR Robot through multiple wall mazes in this constantly changing challenge.

Color Counting Algorithms

Program the VR Robot to detect the color and location of lines.

Coral Reef Cleanup

Help clean the Mangrove Reef by collecting as much trash as you can before the solar-powered batteries on your robot run down.

Disk Mover

Use the electromagnet to pick up and place colored disks into different colored goals to complete challenges.

Sensing Colors

Program the VR Robot to draw and detect different colored lines.

Mondrian Patterns

Program your VR Robot to create a work of modern art inspired by Mondrian.

Counting Lines

Program the VR Robot to track the number of black lines detected using variables.

Cross Every Number

Program the VR Robot to cross off each number from 1-100.

Encoded Message

Use sensors on the VR Robot and Lists (arrays) to decode the message represented by binary ASCII characters.

Robot Vacuum

Program the VR Robot to move like a robotic vacuum.

Word Search

Solve a word search puzzle by highlighting words with your VR Robot.

Castle Color Match

Program the VR Robot to pick up and place disks around the Castle!

Crash the Castle

Create an algorithm to knock over different Castle layouts using the VR Robot in this constantly changing challenge.

On Target

Hit the bullseye by drawing angles with your robot!

Teacher Portal

Computer Science Level 1 Resources

Pacing Guide and Standards Mapping

Email Home

Quiz & Exam Answer Keys for Blocks and Python

Challenge Solutions for Blocks and Python

VEXcode VR Activity Resources

Pacing Guide and Standards Mapping

Email Home

Activity Answers

Questions?

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