

Teacher Facilitation Guide

VIQRC Full Volume Coding Activity

This Facilitation Guide offers a step-by-step guide for how to facilitate as your students complete the VEX IQ Robotics Competition (VIQRC) Full Volume Coding Activity with VEXcode VR. You know your students best, so tailor your teaching and implementation to best suit your students. The activity is designed to be flexible so that you can meet students where they are, giving them the time, space, and instruction necessary to make the most of their learning.

Overview of Universal Design for Learning (UDL)

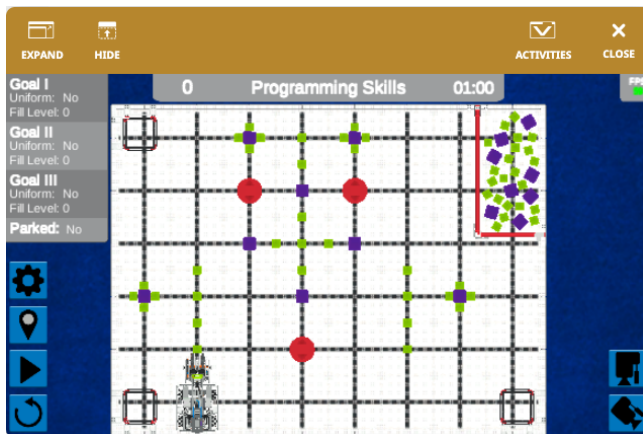
The [UDL Guidelines](#), created by CAST, provide a comprehensive framework for Universal Design for Learning—an approach that enhances teaching and learning for everyone. Incorporating UDL into all lesson plans and learning experiences is a powerful way to support learning for all.

Throughout this document, you'll find "**UDL Move**" callouts that highlight specific areas where UDL principles can be applied to increase student agency and help provide an equitable learning experience. While many UDL Moves are integrated into the Activity itself, these UDL Move callouts offer specific actions you can take as a teacher to improve all students' learning as you implement this Activity.

For deeper exploration of specific UDL principles, you can access detailed resources through embedded links (such as "[Engagement - Optimize choice and autonomy \(7.1\)](#)").

Overview of VIQRC Full Volume

Code Byte, the robot, to score Red, Green, and Purple Blocks in the Goals! Earn as many points as possible within 1 minute!



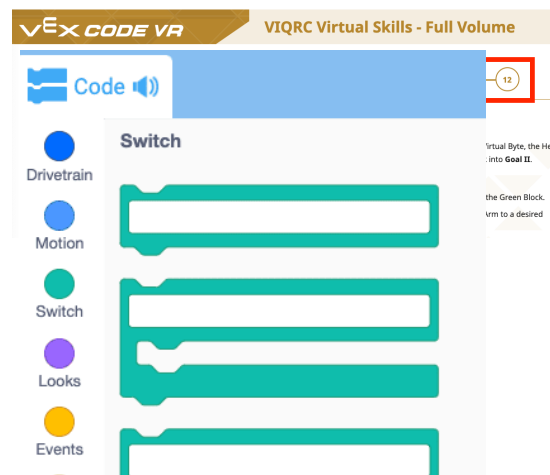
CSTA Standard

- **1B-AP-12** Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

Prepare for the Activity

- Be sure you have access to a printer so that students can print their certificates at the completion of the activity.

- **Try the activity yourself!** A brief experience with the activity will allow you to field questions and support students.
 - Students will begin with scoring Green Blocks in a Goal in the first activity in the Activity Lab, and will progress through more complex challenges throughout the Activity Lab.
 - Preview the challenges by selecting the numbers at the top of the Activity Lab (as shown to the right), to view the different activities.
- Decide how your students should be grouped for this activity. If the groups will be predetermined, organize this ahead of time.
- Ensure students will have a device and web browser that supports VEXcode VR.
 - For more information about accessing VEXcode VR, [view this article](#).
- Decide how students will access the [Full Volume Activity Lab](#). If you are providing it to students directly, decide how you will distribute the link. If you are going to project the Activity Lab for the class, determine how, or if, you will have students move through the different activities.
- **Decide how students will code in VEXcode VR. Students can use Blocks, Python, or Switch to transition between blocks and text.**
 - Switch blocks enable students to incorporate Python commands into their VEXcode VR Blocks projects, creating a bridge that eases the transition from block-based to text-based coding with Python. Switch blocks have the same shapes as other blocks in the VEXcode VR Toolbox, but have a text field in which students can enter Python commands.
 - **Do the following to set the stage for using Switch with your students:**
 - [Read this article to learn more about how Switch can be used to aid students ready to take the next step in their coding learning.](#)
 - Watch this following video with your students to learn what Switch is and why it is helpful
 - [Why Use Switch? video link](#)
 - Watch this video with your students to learn how to use Switch in VEXcode VR
 - [How to Use Switch Blocks video link](#)
- Check out the [VEXcode VR Leaderboard](#)! Think about how you can use the leaderboard to motivate your students. They can see the highest scores of their class and challenge themselves to try to make it into the top. You may want to project the leaderboard to motivate students as they play the game.



UDL Move:

[Engagement - Optimize choice and autonomy \(7.1\)](#): Students can explore Python through Switch blocks and decide how to transition from block-based to text-based coding at their own pace.

[Engagement - Clarify the meaning and purpose of goals \(8.1\)](#): Leaderboard can be used as a way to motivate students to iterate and improve their performance incrementally, promoting persistence.

[Representation - Connect prior knowledge to new learning \(3.1\)](#): Switch blocks act as a bridge to help students connect their prior knowledge of block-based coding to learning new Python commands.

Teaching the Activity

This section will guide you through the steps to implement this Activity Lab in your classroom. Step by step instructions are provided for how to introduce the Activity Lab to your students and what direct instruction is recommended before having students complete the challenges within the Activity Lab.

- 1) Introduce the activity to your students.
 - a) Let them know that they will be coding a VEXcode VR robot to score points in the VIQRC Full Volume competition! [Watch the VIQRC Full Volume game video to learn more about the goals of the game and get your students excited](#). Note for them that they will be competing in the virtual version of the programming skills for Full Volume.
 - b) First, students will learn basic commands to make the robot move to intake a Block, then they'll code it to lift the Block with the arm, and score the Block in a Goal.
 - c) Assign students to their groups.

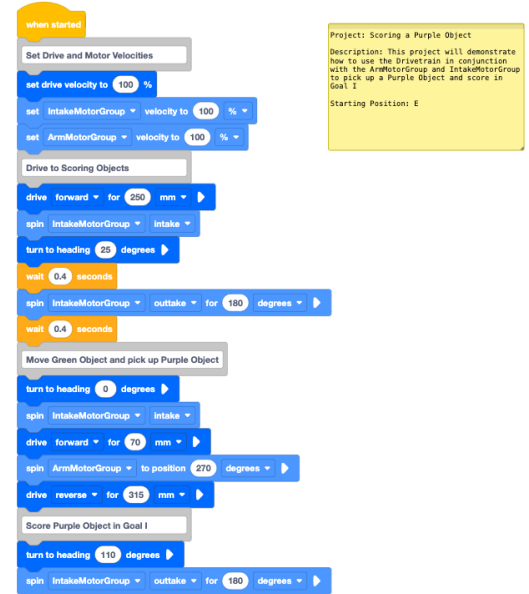
- 2) Have students launch VEXcode VR. They can access it at vr.vex.com.

- 3) Tell students that they must first understand how the robot interacts with Blocks before they can participate in the activity. Guide them through the following instructions to open an example project to see how Byte can intake and score Blocks. [View a screen recording of the example project in action here](#).

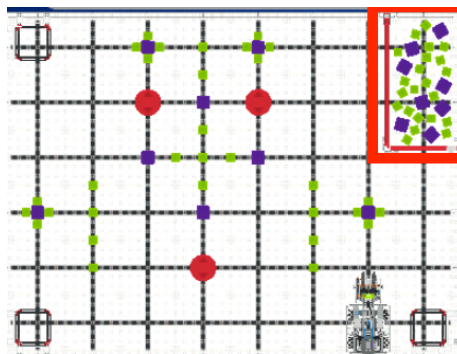
- a) In VEXcode VR, open the Scoring a Purple Object example project.
 - [See this article to learn how to open an example project](#).



- When you open the example project, the Full Volume Playground will open.
 - You will need to change the Starting Position to position E, as noted in the sticky note in the project. Select the location icon on the Playground Window, as shown to the right, and select 'E'.
 - The robot will move to the new starting position.
- b) Run the project.
 - c) Talk about what behaviors the students see the robot performing. The robot will intake a Green Block and release it, then intake a Purple Block, and drive and raise the arm to score the Block.
 - d) Run the project again, and have students follow along with the highlighting in the project to help them connect the blocks in the project to the behaviors the robot is carrying out.



- Pay particular attention to the [Spin for] and [Spin to position] blocks, as students will use these when they begin the Activity Lab for themselves.
- 4) Next, explain the details of the Activity Lab to the students. Students will begin with Activity 1 - Pick it, Score it!, and create a project to score a Green Block in Goal 2. Provide them with [the link to the Activity Lab](#) that they can use while participating in the activity.
- a) Tell students to start by returning the robot to starting position A.
 - Encourage them to plan a path for how they want their robot to drive around the Playground before they begin coding.
 - They can then modify the Scoring a Purple Object example project to accomplish the goal of the first Activity in the Lab, or create a new project.
 - b) Explain the different scoring methods to students. (Note: the score will be automatically calculated and displayed in the Playground Window, and on the splash screen at the end of the project.)
 - Each Block in a Goal = 1 point
 - Each Red Block cleared from a peg = 5 points
 - A Goal with Blocks that are all the same color = 10 point bonus
 - A height bonus can also be added for the common height levels of the Blocks scored in a goal.
 - (1) Low = 10 points
 - (2) Medium = 20 points
 - (3) High = 30 points
 - A robot partially parked in the Supply Zone = 5 points
 - A robot fully parked in the Supply Zone = 10 points
 - Clearing the Supply Zone = 20 points
 - (1) A Supply Zone is the area in the upper right corner of the Field that contains additional Green and Purple Blocks.
 - (2) A Supply Zone is considered cleared when all Blocks have been removed from that area of the Field.



- c) Once students understand the basic commands to make the robot move and use the intake and arm, know how to open example projects, and are familiar with the Activity Lab, allow them to work on the challenge in their groups.

Note: Groups may move at different paces. Walk around the room as groups are actively working to gauge their progress and answer any questions they may have.

UDL Move:

[Engagement - Foster collaboration, interdependence, and collective learning \(8.3\):](#) Encourage students to

work in groups to play Full Volume in order to build their collaborative problem solving and teamwork skills, and to help students recognize how individuals' unique contributions can be combined to create stronger solutions.

[Engagement - Optimize choice and autonomy \(7.1\)](#): Open-ended problem-solving gives students the autonomy to design, pseudocode, and implement their own original solutions.

[Representation - Illustrate through multiple media \(2.5\)](#): Use different media, such as texts, videos, videos with descriptive audios, tables and charts to help them understand the activity.

Facilitating Discussions During the Activity

VIQRC Full Volume is designed to be an open-ended coding exploration. Students can move through the challenges in the Activity Lab at their own pace. Each Activity focuses on a different component of the Full Volume game. To help students stay focused and learn from and with one another, engage them in frequent coding conversations as they are working.

Here are some questions to encourage iteration and problem solving in your students as they progress through the game:

- How can you improve your project to score more Blocks into the Goals?
- How can you improve your project to remove more Red Blocks from the pegs?
- What is your strategy to ensure you score the most points within one minute?
- How are you using the [Spin for] block in your project?
- How are you using the [Spin to position] block in your project?
- Did you attempt to park? What blocks did you use?
- What went well with your project? What do you need to improve for your next try? How will you create code to make your project more effective?
- What did not go well for your robot this time? What can you learn from this that you can improve on for the next run?

UDL Move:

[Engagement - Offer action-oriented feedback \(8.5\)](#): Use the prompts provided above to provide timely, constructive, and goal-oriented feedback that encourages a growth mindset and supports sustained engagement.

[Action & Expression - Enhance capacity for monitoring progress \(6.4\)](#): Use the prompts provided above, such as the last two, to encourage students to reflect on their progress and identify next steps.

After the Activity

Celebrate success! After the activity has ended, celebrate with your students! Choose one or two of these ideas to share your success with others!

- [Print out certificates](#) for each student and display them in your classroom!
- Create a classroom display using the data from the students' certificates and scores over time. Play the game over multiple days, and create a graph showing student improvement over time.
- Share photos and videos of your classroom event on social media. Tag @VEXRobotics so we can celebrate with you!

- Have students take screenshots of the coding projects they are proud of and write a sentence or two about why they feel good about that particular project. Display them around the classroom.

Looking for more?

- Complete the rest of the Activities in the [VIQRC Full Volume Activity Lab](#) to learn about all of the different ways to score in the Full Volume game, and try to score as many points as possible!
- Learn more about the VEX IQ Robotics Competition (VIQRC)! VIQRC consists of matches played on a 6'x8' rectangular field using student-designed robots to meet the challenges in the current game. Two robots cooperate in the Teamwork Challenge as an alliance in 60-second-long teamwork matches, working collaboratively to score points. To learn more about starting and running a VIQRC team, [visit this article](#) in the Robotics Education & Competition Foundation library. [Visit this page](#) to learn more about the 2023-24 VIQRC game, Full Volume.