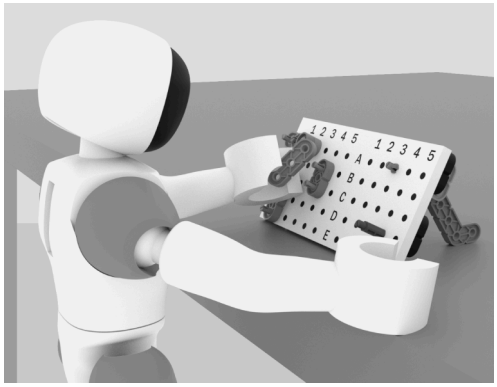
Introduction



In this Unit, students will explore math concepts using the VEX GO Kit. The students will create the Battle Boats game (pictured on the right). As students progress through the Lab, they will apply their coordinate plane math skills, play the game, and become inspired by other teammates' ideas and strategies. Students will use the VEX GO Kit to investigate how to plot points on the coordinate plane such as 1A or 2B to play the Battle Boats game. Students will test out their math skills by playing rounds of the game with a partner. Through this STEM Lab, students will practice perseverance and problem-solving to complete an authentic challenge.

Please keep this letter for your reference as your student works through the Battle Boats Unit. It contains information that you can use to keep up to date on what students are learning and to spark discussions about STEM at home.

Look Inside the VEX GO STEM Lab Unit

In **Lab 1: Battle Boats on a Coordinate Plane**, students will investigate coordinate planes. Lab 1 introduces students to what a coordinate plane is and how to plot points using the VEX GO Kit. Working through an authentic challenge, students will apply their math skills in learning to play the game, Battle Boats. Students will have directions and rules to use during each round of the game. Through discussions about strategies, students will apply their math knowledge to this game-based challenge.

Vocabulary

General notes on encouraging vocabulary usage young children:
The vocabulary words offered are not meant for students to memorize terminology, but to give them language to use to talk about the activities and learning they are doing throughout the Unit. Work these terms into conversations naturally, and positively reinforce this for students as well.

- **Coordinate Plane -** A coordinate plane is a two-dimensional plane formed by the intersection of a vertical line called Y-axis and a horizontal line called X-axis.

- **Point -** A point is an exact location. It has no size, only position.
- **Quadrant -** A graph divided into four sections.
- **Coordinate -** A number in an ordered pair that names the location of a point on the coordinate plane.
- **Graphing -** Drawings that show mathematical information with lines, shapes, and colors. Graphs are also known as charts.
- **Authentic Problem -** Projects that students complete that are real to them compared to assignments that do not resemble any kind of work that would be completed outside a school environment.

Connection to Daily Life

The goal of this STEM Lab is to give students an authentic challenge applying coordinate planes to a real-life scenario, the Battle Boats game. Students will be given real-life examples to make connections on how people use coordinate planes in their daily lives. At the beginning of Lab 1, students will be introduced to a grid map. Using this kind of map, students will see how people can engineer and design towns and cities using coordinates. Plotting points, and discovering how to use a coordinate plane, students will apply their knowledge as they dive deeper into how coordinate planes are used in the world. This is a first step for students to start applying their knowledge of plotting points and visualizing coordinate planes to further investigate in the future.

Follow-up questions to ask at home

Use these questions to discuss the activities that your student is participating in with their group. Included here are questions that address the trial and error that is an essential part of building and developing strategies to use the coordinate plane in the Battle Boats game. It will likely take several tries for your student to create the VEX GO Build and play the game effectively. Asking process-oriented questions and celebrating mistakes can encourage learners to embrace making mistakes and help them build resilience and confidence to persist when confronted with challenges.

1. How do you play the Battle Boats game? What were some strategies you used during the Battle Boats game?
2. What part of the game was the most fun for you and your group? Why?

3. What part of the build or the game was challenging? How did you overcome this challenge with your group?
4. Can you describe what a coordinate plane is? How do you plot a point on a coordinate plane? What kinds of coordinate planes exist in real life?
5. How were you a problem solver with your group?
6. What is something you know about building or about the coordinate plane now, that you didn't know before this STEM Lab? What do you want to learn more about?