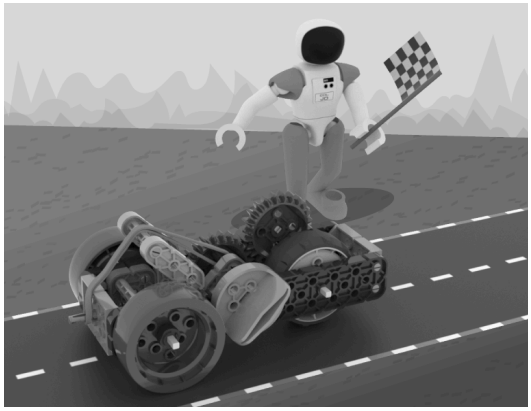
Super Car Letter Home

Introduction



Science, Technology, Engineering, and Mathematics (STEM) education provides students with the opportunity to explore the physical world around them. Students will explore the effects of variables on the performance of a Super Car powered by a rubber band. They will measure and chart the distance traveled and predict further movements of the Super Car based on collected data. Beyond the hands-on activities contained within this unit, students are also prompted to further develop their spatial reasoning skills by describing their choices when manipulating variables and the effects of those variables on the performance of the Super Car.

Please keep this letter for your reference as your student works through the Super Car 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: How Far?**, students will construct the Super Car. They will observe, predict, and measure the movements of the car. This practice with charting data will help students to understand how a varying number of turns affect the distance their Super Car travels.

In **Lab 2: How Does It Go?**, students will experiment with changing variables that affect the motion and energy of the Super Car. They will chart the distances the Super Car travels to identify cause and effect relationships between variables and motion. Students will alter three variables to see which allows the Super Car to travel the furthest distance. After discussing, the students will use that information to predict which variable will cause the Super Car to move the shortest distance.

In **Lab 3: How Fast?**, students will measure the time it takes the Super Car to travel over a certain distance. They will use the information gathered to calculate the average speed of the Super Car. Students will compare and contrast results from different trials, and build an understanding of speed as a relational concept between time and distance.

Vocabulary

General notes on encouraging vocabulary usage with 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.

- **Data -** Gathered facts.
- **Estimation -** A prediction or value that is not exact.
- **Energy -** The ability to change or move.
- **Prediction** - Foretelling on the basis of observation, experience, or scientific reason.
- **Speed** - Rate of motion based on the distance traveled and the amount of time it took to travel that distance.
- **Average Speed** - The total distance traveled by the object divided by the elapsed time to cover that distance.
- **Distance** - The length moved by an object.
- **Variable** - A factor in an experiment that may be subject to change.

Connection to Daily Life

In this Unit, as students test and collect data, it helps reinforce the idea that estimates or predictions can be better when there is relatable information or data. Students already make predictions each day as they try to throw a basketball into a hoop or estimate how long it might take them to run across a field. Practicing the steps to estimate and predict can help students create connections to other concepts like how long it might take them to complete their homework tonight based on how long it took them during previous nights.

Students will also develop their spatial reasoning skills by explaining their variable choices using spatial language. By describing their experiences with each test, students

can practice and improve those spatial reasoning skills that correlate with future STEM achievement and proficiency.

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 investigating. It will likely take several tries for your student to build a successful Super Car and complete test trials 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. Which of the tests in the Unit was your favorite and why?
2. What was something that your group didn't get right the first time, that you had to figure out and try again? How did you solve the problem together?
3. What variables did you change when you made your Super Car the fastest it could go?
4. What patterns did you notice in the speed of the Super Car?
5. How were you a problem solver with your group?
6. What is something that you learned that you want to find out more about?