

Introduction

Science, Technology, Engineering and Mathematics (STEM) education gives students the opportunity to complete hands-on projects that incorporate these subjects in fun, innovative ways.

The following VEX STEM Lab provides a fun way to learn the science behind gravity using robotics. In “Gravity Rush”, students will investigate the center of gravity and acceleration through testing, data collection, and analysis.

Please keep this letter for your reference as your student works through the “Gravity Rush” STEM Lab. It contains information that you can use to keep up to date on what your student is learning and spark discussions about STEM and Robotics.



Look Inside the STEM Lab

In this lab, students will have the opportunity to build a VEX V5 Clawbot as a team. After recording their reflections on the build in their Engineering Notebooks, they will then learn about Center of Gravity and how that applies to cargo carried by their robot. Teams will then use their creativity to improve the build and continue to work together to complete the hands-on "Claw Arm" Challenge. In this activity, teams will test, collect data, and make informed decisions in order to move an object, with their robot, up a ramp, and to a finish line.

Vocabulary

Acceleration

The rate of change in the speed of something over time.

Center of Gravity (CoG)

The point at which weight is evenly distributed and balanced in all directions.

Data Logging

The process of collecting and storing data over a period of time in order to analyze it.

Fulcrum

The point of rest, or support, on which a lever turns.

Inertia

The force that causes something moving to tend to continue moving, and that causes something not moving to tend to continue not to move.

Slope

The angle of a surface where it rises.

Speed

A measure of how fast an object is moving.

Velocity

The speed and direction at which something is traveling.

Engineering Notebook

A type of journal that the students will use to record their designs, ideas, and reflections as they move through the STEM Lab.

VEX V5 Clawbot

The robot build that is used for the STEM Lab. This robot is the result of the first hands-on lesson the students will accomplish. It is used to complete the rest of the STEM Lab activities.

Formulas

Your student will be using the following formula in the STEM Lab:

- Acceleration = change in velocity / change in time
- Change in Velocity = final velocity - initial velocity
- Change in Time = final time - initial time

Real World Connection

Students will be introduced to many new concepts that will make connections to the world around them in this STEM Lab. Gravity Rush uses engaging, hands-on activities that focus on the science concepts behind an object's center of gravity and using data collection to make informed decisions around using that concept. As students explore examples of the center of gravity in the world around them, they will make connections to the relationship of stability with their moving robot. They will also work as a team to find strategies that will lead to success in meeting their goals in the STEM lab.

Guiding at Home Questions

1. What was the best part of creating the robot build in your group?
2. The STEM Lab at school gave the Leaning Tower of Pisa as an example of how the Center of Gravity works. What items have we seen in our travels or at home that would be a good example?
3. Think of something that moves around the house (lawnmower, robotics vacuum). What is its speed and velocity as it runs through its task?

You can explore the STEM Lab at <https://education.vex.com/>.